IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF FLORIDA
WEST PALM BEACH DIVISION

UNITED STATES OF AMERICA

Plaintiff,

v.

HONEYWELL INTERNATIONAL INC.,

Defendant.

07-81036

CIVIL ACTION NO. ____

Consent Decree

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I. BACKGROUND

A. The United States of America ("United States"), on behalf of the Administrator of the United States Environmental Protection Agency ("EPA"), filed a complaint in this matter pursuant to Sections 106 and 107 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. §§ 9606, 9607.

B. The United States in its complaint seeks, inter alia: (1) reimbursement of costs incurred by EPA and the Department of Justice for response actions at the Solitron Superfund Site in Riviera Beach, Florida, together with accrued interest; and (2) performance of studies and response work by the defendant at the Site consistent with the National Contingency Plan, 40 C.F.R. Part 300 (as amended) ("NCP").

C. In accordance with the NCP and Section 121(f)(1)(F) of CERCLA, 42 U.S.C. § 9621(f)(1)(F), EPA notified the State of Florida (the "State") on April 19, 2007, of negotiations with potentially responsible parties regarding the implementation of the remedial design and remedial action for the Site, and EPA has provided the State with an opportunity to participate in such negotiations and be a party to this Consent Decree.

D. In accordance with Section 122(j)(1) of CERCLA, 42 U.S.C. § 9622(j)(1), EPA notified the Department of Interior and NOAA on April 19, 2007, of negotiations with potentially responsible parties regarding the release of hazardous substances that may have resulted in injury to the natural resources under Federal trusteeship and encouraged the trustee(s) to participate in the negotiation of this Consent Decree.

E. The defendant that has entered into this Consent Decree, Honeywell International Inc. ("Honeywell") does not admit any liability to the Plaintiff arising out of the transactions or occurrences alleged in the complaint, nor does it acknowledge that the release or threatened

release of hazardous substances at or from the Site constitutes an imminent or substantial endangerment to the public health or welfare or the environment.

F. This Site is a Superfund Alternative Site ("SAS") and has not yet been placed on the National Priorities List.

G. In response to a release or a substantial threat of a release of hazardous substances at or from the Site, EPA commenced on February 27, 1997, an Expanded Site Inspection ("ESI") and Remedial Investigation ("RI") for the Site pursuant to 40 C.F.R. § 300.430. EPA completed the ESI/RI Report on April 22, 1999.

H. On March 2, 1999, Honeywell initiated a Feasibility Study ("FS") for the Site pursuant to 40 C.F.R. § 300.430. Honeywell submitted an FS Report on July 19, 2000.

I. In response to a request by EPA, Honeywell conducted supplemental remedial investigation activities from September 1999 through January 2003. Honeywell submitted the results of the supplemental remedial investigation and revised FS in July 2003.

J. Pursuant to Section 117 of CERCLA, 42 U.S.C. § 9617, EPA published notice of the completion of the FS and of the proposed plan for remedial action on April 13, 2004, in a major local newspaper of general circulation. EPA provided an opportunity for written and oral comments from the public on the proposed plan for remedial action. A copy of the transcript of the public meeting is available to the public as part of the administrative record upon which the Regional Administrator based the selection of the response action.

K. The decision by EPA on the remedial action to be implemented at the Site is embodied in a final Record of Decision ("ROD"), executed on December 12, 2004, on which the State had a reasonable opportunity to review and comment and has given its concurrence. The

ROD includes a responsiveness summary to the public comments. Notice of the final plan was published in accordance with Section 117(b) of CERCLA.

L. Based on the information presently available to EPA and the State, EPA and the State believe that the Work will be properly and promptly conducted by Honeywell if conducted in accordance with the requirements of this Consent Decree and its appendices.

M. Solely for the purposes of Section 113(j) of CERCLA, the Remedial Action selected in the ROD and the Work to be performed by Honeywell shall constitute a response action taken or ordered by the President.

N. The Parties recognize, and the Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith and implementation of this Consent Decree will expedite the cleanup of the Site and will avoid prolonged and complicated litigation between the Parties, and that this Consent Decree is fair, reasonable, and in the public interest.

NOW, THEREFORE, it is hereby Ordered, Adjudged, and Decreed:

II. JURISDICTION

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1345, and 42 U.S.C. §§ 9606, 9607, and 9613(b). This Court also has personal jurisdiction over Honeywell. Solely for the purposes of this Consent Decree and the underlying complaint, Honeywell waives all objections and defenses that it may have to jurisdiction of the Court or to venue in this District. Honeywell shall not challenge the terms of this Consent Decree or this Court's jurisdiction to enter and enforce this Consent Decree.

III. PARTIES BOUND

2. This Consent Decree applies to and is binding upon the United States and the State and upon Honeywell and its successors and assigns. Any change in ownership or corporate status of a Honeywell including, but not limited to, any transfer of assets or real or personal property, shall in no way alter Honeywell's responsibilities under this Consent Decree.

3. Honeywell shall provide a copy of this Consent Decree to each contractor hired to perform the Work (as defined below) required by this Consent Decree and to each person representing Honeywell with respect to the Site or the Work and shall condition all contracts entered into hereunder upon performance of the Work in conformity with the terms of this Consent Decree. Honeywell or its contractors shall provide written notice of the Consent Decree to all subcontractors hired to perform any portion of the Work required by this Consent Decree. Honeywell shall nonetheless be responsible for ensuring that its contractors and subcontractors perform the Work contemplated herein in accordance with this Consent Decree. With regard to the activities undertaken pursuant to this Consent Decree, each contractor and subcontractor shall be deemed to be in a contractual relationship with Honeywell within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3).

IV. DEFINITIONS

4. Unless otherwise expressly provided herein, terms used in this Consent Decree which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Consent Decree or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

"CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601, *et seq.*

"Consent Decree" shall mean this Decree and all appendices attached hereto (listed in Section XXIX). In the event of conflict between this Decree and any appendix, this Decree shall control.

"Day" shall mean a calendar day unless expressly stated to be a working day. "Working day" shall mean a day other than a Saturday, Sunday, or Federal holiday. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business of the next working day.

"Effective Date" shall be the effective date of this Consent Decree as provided in Paragraph 104.

"EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

"FDEP" shall mean the Florida Department of Environmental Protection and any successor departments or agencies of the State.

"Future Oversight Costs" shall mean that portion of Future Response Costs that EPA incurs in monitoring and supervising Honeywell's performance of the Work to determine whether such performance is consistent with the requirements of this Consent Decree, including costs incurred in reviewing plans, reports and other documents submitted pursuant to this Consent Decree, as well as costs incurred in overseeing implementation of the Work; however, Oversight Costs do not include, *inter alia*: the costs incurred by the United States pursuant to Sections VII (Remedy Review), IX (Access and Institutional Controls), XV (Emergency Response), and Paragraph 85 of Section XXI (Work Takeover), or the costs incurred by the

United States in enforcing the terms of this Consent Decree, including all costs incurred in connection with Dispute Resolution pursuant to Section XIX (Dispute Resolution) and all litigation costs.

"Future Response Costs" shall mean all costs incurred commencing January 1, 2007, including, but not limited to, direct and indirect costs, that the United States incurs in reviewing or developing plans, reports and other items pursuant to this Consent Decree, verifying the Work, or otherwise implementing, overseeing, or enforcing this Consent Decree, including, but not limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Sections VII (Remedy Review), IX (Access and Institutional Controls) (including, but not limited to, the cost of attorney time and any monies paid to secure access and/or to secure or implement institutional controls including, but not limited to, the amount of just compensation), XV (Emergency Response), and Paragraph 85 of Section XXI (Work Takeover).

"Interest," shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

"National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

"Operation and Maintenance" or "O&M" shall mean all activities required to maintain the effectiveness of the Remedial Action as required under the Operation and Maintenance Plan

approved or developed by EPA pursuant to this Consent Decree and the Statement of Work (SOW).

"Paragraph" shall mean a portion of this Consent Decree identified by an arabic numeral or an upper case letter.

"Parties" shall mean the United States and Honeywell.

"Performance Standards" shall mean the cleanup standards and other measures of achievement of the goals of the Remedial Action, set forth in the ROD and referenced in the SOW.

"Plaintiff" shall mean the United States.

"Preliminary Design Report" or "PDR" shall mean the document developed pursuant to Paragraph 10 of this Consent Decree and approved by EPA, and any amendments thereto.

"RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901 *et seq.* (also known as the Resource Conservation and Recovery Act).

"Record of Decision" or "ROD" shall mean the EPA Record of Decision relating to the Site signed on August 12, 2005, by the Regional Administrator, EPA Region 4, or his/her delegate, and all attachments thereto. The ROD is attached as Appendix A.

"Remedial Action" shall mean those activities, except for Operation and Maintenance, to be undertaken by Honeywell to implement the ROD, in accordance with the SOW and the final Remedial Design and Remedial Action Work Plans and other plans approved by EPA.

"Remedial Action Work Plan" or "RA Work Plan" shall mean the document developed pursuant to Paragraph 11 of this Consent Decree and approved by EPA, and any amendments thereto.

"Remedial Design" shall mean those activities to be undertaken by Honeywell to develop the final plans and specifications for the Remedial Action pursuant to the Preliminary Design Report.

"Section" shall mean a portion of this Consent Decree identified by a Roman numeral.

"Honeywell" shall mean Honeywell International Inc.

"Site" shall mean the Solitron Devices Superfund Alternative Site, (Superfund ID # A484) encompassing the groundwater and soil contamination located on the property on which Solitron Devices operated, which is approximately 8.65 acres, located at 1177 Blue Heron Boulevard in Riviera Beach, West Palm County, Florida ("Blue Heron Property"), and the areal extent of the groundwater contamination emanating from the Blue Heron Property or portions of the municipal sewer system connected to the Blue Heron Property.

"State" shall mean the State of Florida.

"Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design, Remedial Action, and Operation and Maintenance at the Site, as set forth in Appendix B to this Consent Decree and any modifications made in accordance with this Consent Decree.

"Supervising Contractor" shall mean the principal contractor retained by Honeywell to supervise and direct the implementation of the Work under this Consent Decree.

"United States" shall mean the United States of America.

"Waste Material" shall mean (1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); (2) any pollutant or contaminant under Section 101(33), 42 U.S.C. § 9601(33); (3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C.

§ 6903(27); and (4) any "hazardous material" under Section 252.82 of the Florida Hazardous Materials Emergency Response and Community Right-to-Know Act of 1988.

"Work" shall mean all activities Honeywell is required to perform under this Consent Decree, except those required by Section XXV (Retention of Records).

V. GENERAL PROVISIONS

5. Objectives of the Parties. The objectives of the Parties in entering into this Consent Decree are to protect public health or welfare or the environment at the Site by the design and implementation of response actions at the Site by Honeywell, to reimburse response costs of the Plaintiff, and to resolve the claims of Plaintiff against Honeywell as provided in this Consent Decree.

6. Commitments by Honeywell.

a. Honeywell shall finance and perform the Work in accordance with this Consent Decree, the ROD, the SOW, and all work plans and other plans, standards, specifications, and schedules set forth herein or developed by Honeywell and approved by EPA pursuant to this Consent Decree. Honeywell shall also reimburse the United States for Future Response Costs as provided in this Consent Decree.

7. Compliance With Applicable Law. All activities undertaken by Honeywell pursuant to this Consent Decree shall be performed in accordance with the requirements of all applicable federal and state laws and regulations. Honeywell must also comply with all applicable or relevant and appropriate requirements of all Federal and state environmental laws as set forth in the ROD and the SOW. The activities conducted pursuant to this Consent Decree, if approved by EPA, shall be considered to be consistent with the NCP.

8. Permits.

a. As provided in Section 121(e) of CERCLA and Section 300.400(e) of the NCP, no permit shall be required for any portion of the Work conducted entirely on-site (i.e., within the areal extent of contamination or in very close proximity to the contamination and necessary for implementation of the Work). Honeywell shall identify all local permits that Honeywell is not required to obtain pursuant to Section 300.400(e) of the NCP, and provide state to EPA how Honeywell will meet the intent of any such permit as required in Section IV 2 C of the SOW. Where any portion of the Work that is not on-site requires a federal, state, or local permit or approval, Honeywell shall submit timely and complete applications and take all other actions necessary to obtain all such permits or approvals.

b. Honeywell may seek relief under the provisions of Section XVIII (Force Majeure) of this Consent Decree for any delay in the performance of the Work resulting from a failure to obtain, or a delay in obtaining, any permit required for the Work.

c. This Consent Decree is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

VI. PERFORMANCE OF THE WORK BY HONEYWELL

9. Selection of Supervising Contractor.

a. All aspects of the Work to be performed by Honeywell pursuant to Sections VI (Performance of the Work by Honeywell), VII (Remedy Review), VIII (Quality Assurance, Sampling and Data Analysis), and XV (Emergency Response) of this Consent Decree shall be under the direction and supervision of the Supervising Contractor, the selection of which shall be subject to disapproval by EPA. Within 10 days after the lodging of this Consent Decree, Honeywell shall notify EPA in writing of the name, title, and qualifications of any contractor

proposed to be the Supervising Contractor. With respect to any contractor proposed to be Supervising Contractor, Honeywell shall demonstrate that the proposed contractor has a quality system that complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA will issue a notice of disapproval or an authorization to proceed. If at any time thereafter, Honeywell proposes to change a Supervising Contractor, Honeywell shall give such notice to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under this Consent Decree.

b. If EPA disapproves a proposed Supervising Contractor, EPA will notify Honeywell in writing. Honeywell shall submit to EPA a list of contractors, including the qualifications of each contractor, that would be acceptable to it within 30 days of receipt of EPA's disapproval of the contractor previously proposed. EPA will provide written notice of the names of any contractor(s) that it disapproves and an authorization to proceed with respect to any of the other contractors. Honeywell may select any contractor from that list that is not disapproved and shall notify EPA of the name of the contractor selected within 21 days of EPA's authorization to proceed.

c. If EPA fails to provide written notice of its authorization to proceed or disapproval as provided in this Paragraph and this failure prevents Honeywell from meeting one

or more deadlines in a plan approved by the EPA pursuant to this Consent Decree, Honeywell may seek relief under the provisions of Section XVIII (Force Majeure) hereof.

10. Remedial Design.

a. Within 30 days after EPA's issuance of an authorization to proceed pursuant to Paragraph 9, Honeywell shall submit to EPA and the State a Draft Preliminary Design Report ("Draft PDR"). The Draft PDR shall provide for the specific scope of the work for the Remedial Design not yet completed by Honeywell, and shall provide for design of the remedy set forth in the ROD, in accordance with the SOW and for achievement of the Performance Standards and other requirements set forth in the ROD, this Consent Decree and the SOW. Within 15 days after EPA's issuance of an authorization to proceed, Honeywell shall submit to EPA and the State a Health and Safety Plan for any field design activities. Instead of preparing a new Health and Safety Plan, Honeywell may update the existing Health and Safety Plan that Honeywell used for recent data collection and well installation activities under the Administrative Order on Consent dated December 13, 2006 for RD data collection activities.

b. The Draft PDR shall include plans and schedules for implementation of all remedial design tasks identified in Section IV of the SOW, including (1) design criteria; (2) plans and specifications describing the design; (3) the plan for satisfying permit requirements; (4) groundwater monitoring plan; (5) sampling and analysis plan; (6) construction cost estimate; and (7) construction schedule. Upon review and comment of the Draft PDR by EPA, after a reasonable opportunity for review and comment by the State, and review of the updated Health and Safety Plan, Honeywell shall prepare a Final PDR. After review and approval of the Final PDR, Honeywell shall implement the Final PDR. Honeywell shall submit to EPA and the State all plans, submittals and other deliverables required under the approved Final PDR in accordance

with the approved schedule for review and approval pursuant to Section XI (EPA Approval of Plans and Other Submissions). Unless otherwise directed by EPA, Honeywell shall not commence further Remedial Design activities at the Site prior to approval of the Final PDR.

c. Upon approval of the Final PDR, and in accordance with the design management schedule established therein, Honeywell shall submit a Draft Remedial Design to EPA.

d. In accordance with the design schedule, and after receiving comments from EPA and the State on the Draft Remedial Design, Honeywell shall submit a Final Remedial Design to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Submissions). The Final Remedial Design shall address comments generated from EPA's and the State's review of the Draft Remedial Design and the PDR. Honeywell shall also submit a memorandum to EPA stating how the comments from EPA and the State to the Draft Remedial Design and PDR were incorporated into the Final Remedial Design.

11. Remedial Action.

a. Concurrent with the submittal of the Final Remedial Design, Honeywell shall submit a draft work plan for the performance of the Remedial Action at the Site ("Draft Remedial Action Work Plan" or "Draft RA Work Plan"). The Draft RA Work Plan shall include the following documents: (1) Project Management Plan; (2) Updated Community Relations Plan, (if determined necessary by EPA); (3) Construction Management Plan, and (4) Construction Quality Assurance Plan to EPA for review and approval pursuant to Section XI (EPA Approval of Plans and Other Submissions). The Draft Remedial Action Work Plan shall provide for construction and implementation of the remedy set forth in the ROD and achievement of the Performance Standards, in accordance with this Consent Decree, the ROD, the SOW, and the

design plans and specifications developed in accordance with the Final Remedial Design Work Plan as approved by EPA.

b. Concurrent with the submittal of the Final Remedial Design, Honeywell shall also submit to EPA a Construction Health and Safety Plan/Contingency Plan, which conforms to the applicable Occupational Safety and Health Administration and EPA requirements including, but not limited to, 29 C.F.R. § 1910.120.

c. Upon approval of the Draft Remedial Action Work Plan by EPA, after a reasonable opportunity for review and comment by the State, Honeywell shall submit to EPA the Final Remedial Action Work Plan, which shall be incorporated into and become enforceable under this Consent Decree.

d. After selection of the construction contractor, Honeywell shall hold a Preconstruction Conference as set forth in the SOW.

e. Upon approval of the Final Remedial Action Work Plan by EPA, after a reasonable opportunity for review and comment by the State, Honeywell shall implement the activities required under the Final Remedial Action Work Plan and submit to EPA and the State all plans, submittals, or other deliverables required under each in accordance with the approved schedule for review and/or approval pursuant to Section XI (EPA Approval of Plans and Other Submissions). Unless otherwise directed by EPA, Honeywell shall not commence physical Remedial Action activities at the Site prior to approval of the Final Remedial Action Work Plan and the Preconstruction Conference.

12. Honeywell shall continue to implement the Remedial Action and the Operation and Maintenance until the Performance Standards are achieved and for so long thereafter as is otherwise required under this Consent Decree.

13. Modification of the SOW or Related Work Plan.

a. If EPA determines that modification to the work specified in the SOW and/or in work plans developed pursuant to the SOW is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the ROD, EPA may require that such modification be incorporated in the SOW and/or such work plans, provided, however, that a modification may only be required pursuant to this Paragraph to the extent that it is consistent with the scope of the remedy selected in the ROD.

b. For the purposes of this Paragraph 13 and Paragraphs 48 and 49 only, the "scope of the remedy selected in the ROD" is the work necessary for the effective implementation of the Solitron Devices Superfund Site selected remedy as set forth in the Solitron Devices Superfund Site ROD, the work necessary for the effective operation and maintenance of the remedy, and the monitoring of the groundwater at the Solitron Devices Superfund Site. Specifically, the remedy includes:

- removal and off-site disposal of a small amount of contaminated surface soil behind the north building;
- extraction and treatment of contaminated groundwater;
- re-injection of treated water that has been oxygenated; and
- natural attenuation of low-level contaminated groundwater outside the capture zone of the extraction well system.

In order to ensure the effective implementation and long-term integrity of the selected remedy, routine monitoring of the extraction and treatment system and regular sampling of the groundwater will be necessary in order to evaluate effectiveness of the extraction and treatment system and to evaluate the progress of natural attenuation. The "scope of the remedy

selected in the ROD" shall include necessary and appropriate adjustments, measures or actions to ensure the effectiveness of the remedy provided, however, the Work shall not include any construction, modifications or adjustments to, measures or actions at, or operations and maintenance of, any municipal potable water treatment facility;

c. If Honeywell objects to any modification determined by EPA to be necessary pursuant to this Paragraph, it may seek dispute resolution pursuant to Section XIX (Dispute Resolution). The SOW and/or related work plans shall be modified in accordance with final resolution of the dispute.

d. Honeywell shall implement any work required by any modifications incorporated in the SOW and/or in work plans developed pursuant to the SOW in accordance with this Paragraph.

e. Nothing in this Paragraph shall be construed to limit EPA's authority to require performance of further response actions as otherwise provided in this Consent Decree.

14. Honeywell acknowledges and agrees that nothing in this Consent Decree, the SOW, or the Draft or Final PDR or Draft or Final RA Work Plans constitutes a warranty or representation of any kind by Plaintiff that compliance with the work requirements set forth in the SOW and the Work Plans or PDRs will achieve the Performance Standards.

15. a. Honeywell shall, prior to any off-site shipment of Waste Material from the Site to an out-of-state waste management facility, provide written notification to the appropriate state environmental official in the receiving facility's state and to the EPA Project Coordinator of such shipment of Waste Material. However, this notification requirement shall not apply to any off-site shipments when the total volume of all such shipments will not exceed 10 cubic yards.

(1) Honeywell shall include in the written notification the following information, where available: (a) the name and location of the facility to which the Waste Material is to be shipped; (b) the type and quantity of the Waste Material to be shipped; (c) the expected schedule for the shipment of the Waste Material; and (d) the method of transportation. Honeywell shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

(2) The identity of the receiving facility and state will be determined by Honeywell following the award of the contract for Remedial Action construction. Honeywell shall provide the information required by Paragraph 15(a) as soon as practicable after the award of the contract and before the Waste Material is actually shipped. Before shipping any hazardous substances, pollutants, or contaminants from the Site to an off-site location, Honeywell shall obtain EPA's certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3) and 40 C.F.R. 300.440. Honeywell shall only send hazardous substances, pollutants, or contaminants from the Site to an off-site facility that complies with the requirements of the statutory provision and regulations cited in the preceding sentence.

VII. REMEDY REVIEW

16. Periodic Review. Honeywell shall conduct any studies and investigations as requested by EPA, in order to permit EPA to conduct reviews of whether the Remedial Action is protective of human health and the environment at least every five years, as required by Section 121(c) of CERCLA and any applicable regulations.

17. EPA Selection of Further Response Actions. If EPA determines, at any time, that the Remedial Action is not protective of human health and the environment, EPA may select further response actions for the Site in accordance with the requirements of CERCLA and the NCP.

18. Opportunity To Comment. Honeywell and, if required by Sections 113(k)(2) or 117 of CERCLA, the public, will be provided with an opportunity to comment on any further response actions proposed by EPA as a result of the review conducted pursuant to Section 1219(c) of CERCLA and to submit written comments for the record during the comment period.

19. Honeywell's Obligation To Perform Further Response Actions. If EPA selects further response actions for the Site, Honeywell shall undertake such further response actions to the extent that the reopener conditions in Paragraph 81, Paragraph 82 , or Paragraph 83 (United States' reservations of liability based on unknown conditions or new information) are satisfied. Honeywell may invoke the procedures set forth in Section XIX (Dispute Resolution) to dispute (1) EPA's determination that the reopener conditions of Paragraph 81, Paragraph 82, or Paragraph 83 of Section XXI (Covenants Not To Sue by Plaintiff) are satisfied, (2) EPA's determination that the Remedial Action is not protective of human health and the environment, or (3) EPA's selection of the further response actions. Disputes pertaining to whether the Remedial Action is protective or to EPA's selection of further response actions shall be resolved pursuant to Paragraph 65 (record review).

20. Submissions of Plans. If Honeywell is required to perform the further response actions pursuant to Paragraph 19, the company shall submit a plan for such work to EPA for approval in accordance with the procedures set forth in Section VI (Performance of the Work by

Honeywell) and shall implement the plan approved by EPA in accordance with the provisions of this Decree.

VIII. QUALITY ASSURANCE, SAMPLING, AND DATA ANALYSIS

21. Honeywell shall use quality assurance, quality control, and chain of custody procedures for all design, compliance and monitoring samples in accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R5)" (EPA/240/B-01/003, March 2001); "Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/240/R-02/009, December 2002), and subsequent amendments. The most recent version of these and other documents related to EPA's Quality System for Environmental Data and Technology can be found at: http://www.epa.gov/quality/. Amended guidelines shall apply only to procedures conducted after the effective date of any amendments. Prior to the commencement of any monitoring project under this Consent Decree, Honeywell shall submit to EPA for approval, after a reasonable opportunity for review and comment by the State, a Quality Assurance Project Plan ("QAPP") that is consistent with the SOW, the NCP and applicable guidance documents. If relevant to the proceeding, the Parties agree that validated sampling data generated in accordance with the QAPP(s) and reviewed and approved by EPA shall be admissible as evidence, without objection, in any proceeding under this Decree. Honeywell shall ensure that EPA and State personnel and its authorized representatives are allowed access at reasonable times to all laboratories utilized by Honeywell in implementing this Consent Decree. In addition, Honeywell shall ensure that such laboratories shall analyze all samples submitted by EPA pursuant to the QAPP for quality assurance monitoring. Honeywell shall ensure that the laboratories it utilizes for the analysis of samples taken pursuant to this Decree perform all analyses according to accepted EPA methods. Accepted EPA methods consist of those methods which are documented in the most recent

"Contract Lab Program Statement of Work for Inorganic Analysis" and the "Contract Lab Program Statement of Work for Organic Analysis." The most recent version of these documents can be found at: http://www.epa.gov/superfund/programs/clp/. However, upon approval by EPA and after opportunity for review and comment by the State, Honeywell may use other analytical methods which are as stringent as or more stringent than the CLP-approved methods. Honeywell shall ensure that all laboratories it uses for analysis of samples taken pursuant to this Consent Decree participate in an EPA or EPA-equivalent QA/QC program. Honeywell shall only use laboratories that have a documented Quality System which complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995), and "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP) as meeting the Quality System requirements. Honeywell shall ensure that all field methodologies utilized in collecting samples for subsequent analysis pursuant to this Decree will be conducted in accordance with the procedures set forth in the QAPP approved by EPA.

22. Upon request, Honeywell shall allow split or duplicate samples to be taken by EPA or its authorized representatives. Honeywell shall notify EPA not less than 28 days in advance of any sample collection activity unless shorter notice is agreed to by EPA. In addition, EPA shall have the right to take any additional samples that EPA deems necessary. Upon request, EPA shall allow Honeywell to take split or duplicate samples of any samples it takes as part of the Plaintiff's oversight of Honeywell's implementation of the Work.

23. Honeywell shall submit to EPA three (3) copies and to the State two (2) copies of the results of all sampling and/or tests or other data obtained or generated by or on behalf of Honeywell with respect to the Site and/or the implementation of this Consent Decree unless EPA agrees otherwise.

24. Notwithstanding any provision of this Consent Decree, the United States hereby retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under CERCLA, RCRA and any other applicable statutes or regulations.

IX. ACCESS AND INSTITUTIONAL CONTROLS

25. If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Consent Decree, is owned or controlled by Honeywell, Honeywell shall:

a. commencing on the date of lodging of this Consent Decree, provide the United States and its representatives, including EPA and its contractors, with access at all reasonable times to the Site, or such other property, for the purpose of conducting any activity related to this Consent Decree including, but not limited to, the following activities:

(1) Monitoring the Work;

(2) Verifying any data or information submitted to the United States;

(3) Conducting investigations relating to contamination at or near the Site;

(4) Obtaining samples;

(5) Assessing the need for, planning, or implementing additional response actions at or near the Site;

(6) Assessing implementation of quality assurance and quality control practices as defined in the approved Quality Assurance Project Plans;

(7) Implementing the Work pursuant to the conditions set forth in Paragraph 85 of this Consent Decree;

(8) Inspecting and copying records, operating logs, contracts, or other documents maintained or generated by Honeywell or their agents, consistent with Section XXIV (Access to Information);

(9) Assessing Honeywell's compliance with this Consent Decree; and

(10) Determining whether the Site or other property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to this Consent Decree;

b. Commencing on the date of lodging of this Consent Decree, refrain from using the Site, or such other property, in any manner that would interfere with or adversely affect the implementation, integrity, or protectiveness of the remedial measures to be performed pursuant to this Consent Decree.

c. Execute and record in Public Records of Palm Beach County, State of Florida, an easement, running with the land, that (i) grants a right of access for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 25(a) of this Consent Decree, and (ii) grants the right to enforce the land/water use restrictions listed in Paragraph 25(b) of this Consent Decree, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Decree. Honeywell shall grant the excess rights and the rights to enforce the land/water use restrictions to

(i) the United States, on behalf of EPA, and its representatives, (ii) the State and its representatives, and/or (iii) other appropriate grantees. If EPA shall request, Honeywell shall, within 45 days of entry of this Consent Decree, submit to EPA for review and approval with respect to such property:

(1) a draft easement that is enforceable under the laws of the State of Florida, and

(2) a current title insurance commitment or some other evidence of title acceptable to EPA, which show's title to the land described in the easement to be free and clear of all prior liens and encumbrances (except when those liens or encumbrances are approved by EPA or when, despite best efforts, Honeywell is unable to obtain release or subordination of such prior liens or encumbrances).

Within 15 days of EPA's approval and acceptance of the easement and the title evidence, Honeywell shall update the title search and, if it is determined that nothing has occurred since the effective date of the commitment to affect the title adversely, record the easement in the Public Records of Palm Beach County. Within 30 days of recording the easement, Honeywell shall provide EPA with a final title insurance policy, or other final evidence of title acceptable to EPA, and a certified copy of the original recorded easement showing the clerk's recording stamps. If the easement is to be conveyed to the United States, the easement and title evidence (including final title evidence) shall be prepared in accordance with the U.S. Department of Justice Title Standards 2001, and approval of the sufficiency of title must be obtained as required by 40 U.S.C. § 255.

26. If the Site, or any other property where access and/or land/water use restrictions are needed to implement this Consent Decree, is owned or controlled by persons other than any of Honeywell, Honeywell shall use best efforts to secure from such persons:

a. an agreement to provide access thereto for Honeywell, as well as for the United States on behalf of EPA, and the State, as well as their representatives (including contractors), for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 25(a) of this Consent Decree;

b. an agreement enforceable by Honeywell and the United States, to refrain from using the Site, or other such property, in any manner that would interfere with or adversely affect, the implementation, effect or integrity, or protectiveness of the remedial measures to be performed pursuant to this Consent Decree. Such restrictions include, but are not limited to those activities listed in Paragraph 25 and;

c. the execution and recordation in the Public Records of Palm Beach County, State of Florida, of an easement, running with the land, that (i) grants a right of access for the purpose of conducting any activity related to this Consent Decree including, but not limited to, those activities listed in Paragraph 25(a) of this Consent Decree, and (ii) grants the right to enforce the land/water use restrictions listed in Paragraph of this Consent Decree, or other restrictions that EPA determines are necessary to implement, ensure non-interference with, or ensure the protectiveness of the remedial measures to be performed pursuant to this Consent Decree. The access rights and/or rights to enforce land/water use restrictions shall be granted to (i) the United States, on behalf of EPA, and its representatives, (ii) the State and its representatives, (iii) Honeywell and their representatives, and/or (iv) other appropriate grantees. Within 45 days of

entry of this Consent Decree, Honeywell shall submit to EPA for review and approval with respect to such property:

(1) a draft easement that is enforceable under the laws of the State of Florida, and

(2) a current title insurance commitment, or some other evidence of title acceptable to EPA, which shows title to the land described in the easement to be free and clear of all prior liens and encumbrances (except when those liens or encumbrances are approved by EPA or when, despite best efforts, Honeywell is unable to obtain release or subordination of such prior liens or encumbrances).

Within 15 days of EPA's approval and acceptance of the easement and the title evidence, Honeywell shall update the title search and, if it is determined that nothing has occurred since the effective date of the commitment to affect the title adversely, the easement shall be recorded in the Public records of Palm Beach County. Within 30 days of the recording of the easement, Honeywell shall provide EPA with a final title insurance policy, or other final evidence of title acceptable to EPA, and a certified copy of the original recorded easement showing the clerk's recording stamps. If easement is to be conveyed to the United States, the easement and title evidence (including final title evidence) shall be prepared in accordance with the U.S. Department of Justice Title Standards 2001, and approval of the sufficiency of title must be obtained as required by 40 U.S.C. § 255.

27. For purposes of Paragraphs 25 and 26 of this Consent Decree, "best efforts" includes the payment of reasonable sums of money in consideration of access, access easements, land/water use restrictions, restrictive easements, and/or an agreement to release or subordinate a prior lien or encumbrance. If (a) any access or land/water use restriction agreements required by

Paragraphs 26(a) or 26(b) of this Consent Decree are not obtained within 45 days of the date of entry of this Consent Decree, (b) any access easements or restrictive easements required by Paragraph 26(c) of this Consent Decree are not submitted to EPA in draft form within 45 days of the date of entry of this Consent Decree, or (c) Honeywell is unable to obtain an agreement pursuant to Paragraph 25(c)(1) or Paragraph 26(c)(1) from the holder of a prior lien or encumbrance to release or subordinate such lien or encumbrance to the easement being created pursuant to this consent decree within 45 days of the date of entry of this consent decree, Honeywell shall promptly notify the United States in writing, and shall include in that notification a summary of the steps that Honeywell has taken to attempt to comply with Paragraph 25 or 26 of this Consent Decree. The United States may, as it deems appropriate, assist Honeywell in obtaining access or land/water use restrictions, either in the form of contractual agreements or in the form of easements running with the land, or in obtaining the release or subordination of a prior lien or encumbrance. Honeywell shall reimburse the United States in accordance with the procedures in Section XVI (Payments For Response Costs), for all costs incurred, direct or indirect, by the United States in obtaining such access, land/water use restrictions, and/or the release/subordination of prior liens or encumbrances including, but not limited to, the cost of attorney time and the amount of monetary consideration paid or just compensation.

28. If EPA determines that land/water use restrictions in the form of state or local laws, regulations, ordinances or other governmental controls are needed to implement the remedy selected in the ROD, ensure the integrity and protectiveness thereof, or ensure non-interference therewith, Honeywell shall cooperate with EPA's efforts to secure such governmental controls.

29. Notwithstanding any provision of this Consent Decree, the United States retains all of its access authorities and rights, as well as all of its rights to require land/water use restrictions,

including enforcement authorities related thereto, under CERCLA, RCRA and any other applicable statute or regulations.

X. REPORTING REQUIREMENTS

30. In addition to any other requirement of this Consent Decree, Honeywell shall submit to EPA one (1) copy and the State one (1) copy of written monthly progress reports that: (a) describe the actions which have been taken toward achieving compliance with this Consent Decree during the previous month; (b) include a summary of all results of sampling and tests and all other data received or generated by Honeywell or their contractors or agents in the previous month; (c) identify all work plans, plans and other deliverables required by this Consent Decree completed and submitted during the previous month; (d) describe all actions, including, but not limited to, data collection and implementation of work plans, which are scheduled for the next six weeks and provide other information relating to the progress of construction, including, but not limited to, critical path diagrams, Gantt charts and Pert charts; (e) include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation of the Work, and a description of efforts made to mitigate those delays or anticipated delays; (f) include any modifications to the work plans or other schedules that Honeywell has proposed to EPA or that have been approved by EPA; and (g) describe all activities undertaken in support of the Community Relations Plan during the previous month and those to be undertaken in the next six weeks. Honeywell shall submit these progress reports to EPA and the State by the tenth day of every month following the lodging of this Consent Decree until EPA notifies Honeywell pursuant to Paragraph 48(b) of Section XIV (Certification of Completion). If requested by EPA, Honeywell shall also provide briefings for EPA to discuss the progress of the Work.

31. Honeywell shall notify EPA of any change in the schedule described in the monthly progress report for the performance of any activity, including, but not limited to, data collection and implementation of work plans, no later than seven days prior to the performance of the activity.

32. Upon the occurrence of any event during performance of the Work that Honeywell is required to report pursuant to Section 103 of CERCLA or Section 304 of the Emergency Planning and Community Right-to-know Act (EPCRA), Honeywell shall within 24 hours of the onset of such events orally notify the EPA Project Coordinator or the Alternate EPA Project Coordinator (in the event of the unavailability of the EPA Project Coordinator), or, in the event that neither the EPA Project Coordinator nor the Alternate EPA Project Coordinator is available, the Emergency Response Section, Region 4, United States Environmental Protection Agency. These reporting requirements are in addition to the reporting required by CERCLA Section 103 or EPCRA Section 304.

33. Within 20 days of the onset of such an event, Honeywell shall furnish to Plaintiff a written report, signed by Honeywell's Project Coordinator, setting forth the events which occurred and the measures taken, and to be taken, in response thereto. Within 30 days of the conclusion of such an event, Honeywell shall submit a report setting forth all actions taken in response thereto.

34. Honeywell shall submit four (4) copies to EPA and three (3) copies to the State of all plans, reports, and data required by the SOW, the Remedial Design Work Plan, the Remedial Action Work Plan, or any other approved plans in accordance with the schedules set forth in such plans. Upon request by EPA, Honeywell shall submit in electronic form all portions of any report

or other deliverable Honeywell is required to submit pursuant to the provisions of this Consent Decree.

35. All reports and other documents submitted by Honeywell to EPA (other than the monthly progress reports referred to above) which purport to document Honeywell's compliance with the terms of this Consent Decree shall be signed by an authorized representative of Honeywell.

XI. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS

36. After review of any plan, report or other item which is required to be submitted for approval pursuant to this Consent Decree, EPA, after reasonable opportunity for review and comment by the State, shall: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that Honeywell to modify the submission; or (e) any combination of the above. However, EPA shall not modify a submission without first providing Honeywell at least one notice of deficiency and an opportunity to cure within thirty (30) days, except where to do so would cause serious disruption to the Work or where previous submissions(s) have been disapproved due to material defects and the deficiencies in the submission under consideration indicate a bad faith lack of effort to submit an acceptable deliverable.

37. In the event of approval, approval upon conditions, or modification by EPA, pursuant to Paragraph 36(a), (b), or (c), Honeywell shall proceed to take any action required by the plan, report, or other item, as approved or modified by EPA subject only to their right to invoke the Dispute Resolution procedures set forth in Section XIX (Dispute Resolution) with respect to the modifications or conditions made by EPA. In the event that EPA modifies the

submission to cure the deficiencies pursuant to Paragraph 36(c) and the submission has a material defect, EPA retains its right to seek stipulated penalties, as provided in Section XX (Stipulated Penalties).

38. Resubmission of Plans.

a. Upon receipt of a notice of disapproval pursuant to Paragraph 36(d), Honeywell shall, within thirty (30) days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the plan, report, or other item for approval. Any stipulated penalties applicable to the submission, as provided in Section XX, shall accrue during the 30-day period or otherwise specified period but shall not be payable unless the resubmission is disapproved or modified due to a material defect as provided in Paragraphs 39 and 40.

b. Notwithstanding the receipt of a notice of disapproval pursuant to Paragraph 36(d), Honeywell shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submission. Implementation of any non-deficient portion of a submission shall not relieve Honeywell of any liability for stipulated penalties under Section XX (Stipulated Penalties).

39. In the event that a resubmitted plan, report or other item, or portion thereof, is disapproved by EPA, EPA may again require Honeywell to correct the deficiencies, in accordance with the preceding Paragraphs. EPA also retains the right to modify or develop the plan, report or other item. Honeywell shall implement any such plan, report, or item as modified or developed by EPA, subject only to their right to invoke the procedures set forth in Section XIX (Dispute Resolution).

40. If upon Resubmission, a plan, report, or item is disapproved or modified by EPA due to a material defect, Honeywell shall be deemed to have failed to submit such plan, report, or

item timely and adequately unless Honeywell invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution) and EPA's action is overturned pursuant to that Section. The provisions of Section XIX (Dispute Resolution) and Section XX (Stipulated Penalties) shall govern the implementation of the Work and accrual and payment of any stipulated penalties during Dispute Resolution. If EPA's disapproval or modification is upheld, stipulated penalties shall accrue for such violation from the date on which the initial submission was originally required, as provided in Section XX.

41. All plans, reports, and other items required to be submitted to EPA under this Consent Decree shall, upon approval or modification by EPA, be enforceable under this Consent Decree. In the event EPA approves or modifies a portion of a plan, report, or other item required to be submitted to EPA under this Consent Decree, the approved or modified portion shall be enforceable under this Consent Decree.

XII. PROJECT COORDINATORS

42. Within 20 days of lodging this Consent Decree, Honeywell and EPA will notify each other, in writing, of the name, address and telephone number of their respective designated Project Coordinators and Alternate Project Coordinators. If a Project Coordinator or Alternate Project Coordinator initially designated is changed, the identity of the successor will be given to the other Parties at least five (5) working days before the changes occur, unless impracticable, but in no event later than the actual day the change is made. Honeywell's Project Coordinator shall be subject to disapproval by EPA and shall have the technical expertise sufficient to adequately oversee all aspects of the Work. Honeywell's Project Coordinator shall not be an attorney for Honeywell in this matter. He or she may assign other representatives, including other contractors,

to serve as a Site representative for oversight of performance of daily operations during remedial activities.

43. Plaintiffs may designate other representatives, including, but not limited to, EPA and State employees, and federal and State contractors and consultants, to observe and monitor the progress of any activity undertaken pursuant to this Consent Decree. EPA's Project Coordinator and Alternate Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager (RPM) and an On-Scene Coordinator (OSC) by the National Contingency Plan, 40 C.F.R. Part 300. In addition, EPA's Project Coordinator or Alternate Project Coordinator shall have authority, consistent with the National Contingency Plan, to halt any Work required by this Consent Decree and to take any necessary response action when he/she determines that conditions at the Site constitute an emergency situation or may present an immediate threat to public health or welfare or the environment due to release or threatened release of Waste Material.

XIII. PERFORMANCE GUARANTEE

44.1. In order to ensure full and final completion of the Work, Honeywell shall establish and maintain a Performance Guarantee for the benefit of EPA in the amount of $500,000 in one or more of the forms identified in Subparagraphs (a)-(c) below, which must be satisfactory in form and substance to EPA. Honeywell shall also establish and maintain a Performance Guarantee for the benefit of EPA in the amount of $3 million, in one or more of the forms identified in (a)-(f) below, which must be satisfactory in form and substance to EPA. For purposes of this Section XIII, the combined total of $3,500,000 shall be the Estimated Cost of the Work.

a. A surety bond unconditionally guaranteeing payment and/or performance of the Work that is issued by a surety company using those listed as acceptable sureties on Federal bonds as set forth in Circular 570 of the U.S. Department of Treasury;

guaranteeing performance of the Work;

b. One or more irrevocable letters of credit, payable to or at the direction of EPA, that is issued by one or more financial institution(s) (i) that has(have) the authority to issue letters of credit and (ii) whose letter-of-credit operations are regulated and examined by a U.S. Federal or State agency;

c. A fully funded trust fund established for the benefit of EPA that is administered by a trustee (i) that has the authority to act as a trustee and (ii) whose trust operations are regulated and examined by a U.S. Federal or State agency;

d. A policy of insurance that (i) provides EPA with acceptable rights as a beneficiary thereof; and (ii) is issued by an insurance carrier (a) that has the authority to issue insurance policies in the applicable jurisdiction and (b) whose insurance operations are regulated and examined by a State agency;

e. A demonstration by Honeywell that it meets the financial test criteria of 40 C.F.R. § 264.143(f) with respect to the portion of the Estimated Cost of the Work being addressed by the financial test, provided that all other requirements or 40 C.F.R. § 264.13(f) are satisfied; or

f. A written guarantee to fund or perform the Work executed in favor of EPA by one or more of the following: (i) a direct or indirect parent company or subsidiary of Honeywell or (ii) a company that has a "substantial business relationship" (as defined in 40 C.F.R. § 264.141(h)) with Honeywell; provided, however, that any company providing such a guarantee

must demonstrate to the satisfaction of EPA that it satisfies the financial test requirements of 40 C.F.R. 264.143(f) with respect to the portion of the Estimated Cost of the Work that it proposes to guarantee hereunder. The Estimated Cost of the Work is the total amount to be covered by a Performance Guarantee(s) under this Consent Decree.

44.2. Honeywell has selected, and EPA has approved, as an initial Performance Guarantee a Letter of Credit. Within thirty (30) days after entry of this Consent Decree, Honeywell shall execute or otherwise finalize all instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding in a form satisfactory to EPA, and such Performance Guarantee shall thereupon be fully effective. Within thirty (30) days of entry of this Consent Decree, Honeywell shall submit all executed and/or otherwise finalized instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding to the EPA Superfund Records Program Manager, U.S. Environmental Protection Agency, Region 4, 61 Forsyth St., SW, Atlanta, GA 30303, with a copy to the United States and EPA as specified in Section XXVI (Notices and Submissions). Such instruments or documents must contain notification or a cover letter identifying the Site which is the subject of the financial guarantee.

45. If at any time during the effective period of this Consent Decree, Honeywell provides a Performance Guarantee for completion of the Work by means of a demonstration or guarantee pursuant to Paragraph 44.1(e) or Paragraph 44.1(f) above, Honeywell shall also comply with the other relevant requirements of 40 C.F.R. § 264.143(f), 40 C.F.R. § 264.151(f), and 40 C.F.R. § 264.151(h)(1) relating to these methods unless otherwise provided in this Consent Decree, including but not limited to (i) the initial submission of required financial reports and statements from the relevant entity's chief financial officer and independent certified public

accountant; (ii) the annual re-submission of such reports and statements within 90 days after the close of each such entity's fiscal year; and (iii) the notification of EPA within 90 days after the close of any fiscal year in which such entity no longer satisfies the financial test requirements set forth at 40 C.F.R. § 264.143(f)(1). For purposes of the Performance Guarantee methods specified in this Section XIII, references in 40 C.F.R. Part 264, Subpart H, to "closure," "post-closure," and "plugging and abandonment" shall be deemed to refer to the Work required under this Consent Decree, and the terms "current closure cost estimate" "current post-closure cost estimate," and "current plugging and abandonment cost estimate" shall be deemed to refer to the Estimated Cost of the Work.

45.1. In the event that EPA determines at any time that a Performance Guarantee provided by Honeywell pursuant to this Section is inadequate or otherwise no longer satisfies the requirements set forth in this Section, whether due to an increase in the estimated cost of completing the Work or for any other reason, or in the event that any Honeywell becomes aware of information indicating that a Performance Guarantee provided pursuant to this Section is inadequate or otherwise no longer satisfies the requirements set forth in this Section, whether due to an increase in the estimated cost of completing the Work or for any other reason, Honeywell, within 30 days of receipt of notice of EPA's determination or, as the case may be, within thirty (30) days of Honeywell becoming aware of such information, shall obtain and present to EPA for approval a proposal for a revised or alternative form of Performance Guarantee listed in Paragraph 44.1 of this Consent Decree that satisfies all requirements set forth in this Section XIII. In seeking approval for a revised or alternative form of Performance Guarantee, Honeywell shall follow the procedures set forth in Paragraph 47(b)(2) of this Consent Decree. Honeywell's inability to post a Performance Guarantee for completion of the Work shall in no way excuse

performance of any other requirements of this Consent Decree, including, without limitation, the obligation of Honeywell to complete the Work in strict accordance with the terms hereof.

46. The commencement of any Work Takeover pursuant to Paragraph 85 of this Consent Decree shall trigger EPA's right to receive the benefit of any Performance Guarantee(s) provided pursuant to Paragraph 44.1(a), (b), (c), (d), or (f), and at such time EPA shall have immediate access to resources guaranteed under any such Performance Guarantee(s), whether in cash or in kind, as needed to continue and complete the Work assumed by EPA under the Work Takeover. If for any reason EPA is unable to promptly secure the resources guaranteed under any such Performance Guarantee(s), whether in cash or in kind, necessary to continue and complete the Work assumed by EPA under the Work Takeover, or in the event that the Performance Guarantee involves a demonstration of satisfaction of the financial test criteria pursuant to Paragraph 44.1(e), Honeywell shall immediately upon written demand from EPA deposit into an account specified by EPA, in immediately available funds and without setoff, counterclaim, or condition of any kind, a cash amount up to but not exceeding the estimated cost of the remaining Work to be performed as of such date, as determined by EPA.

47. Modification of Amount and/or Form of Performance Guarantee.

a. Reduction of Amount of Performance Guarantee. If Honeywell believes that the estimated cost to complete the remaining Work has diminished below the amount set forth in Paragraph 44.1 above, Honeywell may, on any anniversary date of entry of this Consent Decree, or at any other time agreed to by the Parties, petition EPA in writing to request a reduction in the amount of the Performance Guarantee provided pursuant to this Section so that the amount of the Performance Guarantee is equal to the estimated cost of the remaining Work to be performed. Honeywell shall submit a written proposal for such reduction to EPA that shall

specify, at a minimum, the cost of the remaining Work to be performed and the basis upon which such cost was calculated. In seeking approval for a reduction of the amount of the Performance Guarantee, Honeywell shall follow the procedures set forth in Paragraph 47(b)(2) of this Consent Decree. If EPA decides to accept such a proposal, EPA shall notify the petitioning Honeywell of such decision in writing. After receiving EPA's written acceptance, Honeywell may reduce the amount of the Performance Guarantee in accordance with and to the extent permitted by such written acceptance. In the event of a dispute, Honeywell may reduce the amount of the Performance Guarantee required hereunder only in accordance with a final administrative or judicial decision resolving such dispute. No change to the form or terms of any Performance Guarantee provided under this Section, other than a reduction in amount, is authorized except as provided in Paragraphs 45.1 or 47(b) of this Consent Decree.

b. Change of Form of Performance Guarantee.

(1) If, after entry of this Consent Decree, Honeywell desires to change the form or terms of any Performance Guarantee(s) provided pursuant to this Section, Honeywell may, on any anniversary date of entry of this Consent Decree, or at any other time agreed to by the Parties, petition EPA in writing to request a change in the form of the Performance Guarantee provided hereunder. The submission of such proposed revised or alternative form of Performance Guarantee shall be as provided in Paragraph 47(b)(2) of this Consent Decree. Any decision made by EPA on a petition submitted under this Subparagraph (b)(1) shall be made in EPA's sole and unreviewable discretion, and such decision shall not be subject to challenge by Honeywell pursuant to the dispute resolution provisions of this Consent Decree or in any other forum.

(2) Honeywell shall submit a written proposal for a revised or alternative form of Performance Guarantee to EPA which shall specify, at a minimum, the

estimated cost of the remaining Work to be performed, the basis upon which such cost was calculated, and the proposed revised form of Performance Guarantee, including all proposed instruments or other documents required in order to make the proposed Performance Guarantee legally binding. The proposed revised or alternative form of Performance Guarantee must satisfy all requirements set forth or incorporated by reference in this Section. Honeywell shall submit such proposed revised or alternative form of Performance Guarantee to the Superfund Records Program Manager as provided in Paragraph 44.2, with a copy to the United States and EPA in accordance with Section XXVI (Notices and Submissions) of this Consent Decree. EPA shall notify Honeywell in writing of its decision to accept or reject a revised or alternative Performance Guarantee submitted pursuant to this subparagraph. Within 10 days after receiving a written decision approving the proposed revised or alternative Performance Guarantee, Honeywell shall execute and/or otherwise finalize all instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding in a form substantially identical to the documents submitted to EPA as part of the proposal, and such Performance Guarantee(s) shall thereupon be fully effective. Honeywell shall submit all executed and/or otherwise finalized instruments or other documents required in order to make the selected Performance Guarantee(s) legally binding to the Superfund Records Program Manager within 30 days of receiving a written decision approving the proposed revised or alternative Performance Guarantee, with a copy to the United States and EPA as specified in Section XXVI (Notices and Submissions).

c. Release of Performance Guarantee. If Honeywell receives written notice from EPA in accordance with Paragraph 48 hereof that the Work has been fully and finally completed in accordance with the terms of this Consent Decree, or if EPA otherwise so notifies Honeywell in writing, Honeywell may thereafter release, cancel, or discontinue the Performance

Guarantee(s) provided pursuant to this Section. Honeywell shall not release, cancel, or discontinue any Performance Guarantee provided pursuant to this Section except as provided in this subparagraph. In the event of a dispute, Honeywell may release, cancel, or discontinue the Performance Guarantee(s) required hereunder only in accordance with a final administrative or judicial decision resolving such dispute.

XIV. CERTIFICATION OF COMPLETION

48. Completion of the Remedial Action.

a. Within 90 days after Honeywell concludes that the Remedial Action has been fully performed and the Performance Standards have been attained, Honeywell shall schedule and conduct a pre-certification inspection to be attended by Honeywell and EPA. If, after the pre-certification inspection, Honeywell still believes that the Remedial Action has been fully performed and the Performance Standards have been attained, it shall submit a written report requesting certification to EPA for approval, with a copy to the State, pursuant to Section XI (EPA Approval of Plans and Other Submissions) within 30 days of the inspection. In the report, a registered professional engineer and Honeywell's Project Coordinator shall state that the Remedial Action has been completed in full satisfaction of the requirements of this Consent Decree. The written report shall include as-built drawings signed and stamped by a professional engineer. The report shall contain the following statement, signed by a responsible corporate official of a Honeywell or Honeywell's Project Coordinator:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true,

accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity to review and comment by the State, determines that the Remedial Action or any portion thereof has not been completed in accordance with this Consent Decree or that the Performance Standards have not been achieved, EPA will notify Honeywell in writing of the activities that must be undertaken by Honeywell pursuant to this Consent Decree to complete the Remedial Action and achieve the Performance Standards, provided, however, that EPA may only require Honeywell to perform such activities pursuant to this Paragraph to the extent that such activities are consistent with the "scope of the remedy selected in the ROD," as that term is defined in Paragraph 13(b) EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Honeywell to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Submissions). Honeywell shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion and after a reasonable opportunity for review and comment by the State, that the Remedial Action has been performed in accordance with this Consent Decree and that the Performance Standards have been achieved, EPA will so certify in writing to Honeywell. This certification shall constitute the Certification of Completion of the Remedial Action for

purposes of this Consent Decree, including, but not limited to, Section XXI (Covenants Not to Sue by Plaintiff). Certification of Completion of the Remedial Action shall not affect Honeywell's obligations under this Consent Decree.

49. Completion of the Work.

a. Within 90 days after Honeywell concludes that all phases of the Work (including O & M), have been fully performed, Honeywell shall schedule and conduct a pre-certification inspection to be attended by Honeywell and EPA. If, after the pre-certification inspection, Honeywell still believes that the Work has been fully performed, Honeywell shall submit a written report by a registered professional engineer stating that the Work has been completed in full satisfaction of the requirements of this Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of a Honeywell or Honeywell's Project Coordinator:

> To the best of my knowledge, after thorough investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If, after review of the written report, EPA, after reasonable opportunity to review and comment by the State, determines that any portion of the Work has not been completed in accordance with this Consent Decree, EPA will notify Honeywell in writing of the activities that must be undertaken by Honeywell pursuant to this Consent Decree to complete the Work, provided, however, that EPA may only require Honeywell to perform such activities pursuant to this Paragraph to the extent

that such activities are consistent with the "scope of the remedy selected in the ROD," as that term is defined in Paragraph 13(b) EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require Honeywell to submit a schedule to EPA for approval pursuant to Section XI (EPA Approval of Plans and Other Submissions). Honeywell shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to their right to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent request for Certification of Completion by Honeywell and after a reasonable opportunity for review and comment by the State, that the Work has been performed in accordance with this Consent Decree, EPA will so notify Honeywell in writing.

XV. EMERGENCY RESPONSE

50. In the event of any action or occurrence during the performance of the Work which causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Honeywell shall, subject to Paragraph 51, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately notify the EPA's Project Coordinator, or, if the Project Coordinator is unavailable, EPA's Alternate Project Coordinator. If neither of these persons is available, Honeywell shall notify the EPA Emergency Response Unit, Region 4. Honeywell shall take such actions in consultation with EPA's Project Coordinator or other available authorized EPA officer and in accordance with all applicable provisions of the Health and Safety Plans, the Contingency Plans, and any other applicable plans or documents developed pursuant to the SOW. In the event that Honeywell fails to take

appropriate response action as required by this Section, and EPA takes such action instead, Honeywell shall reimburse EPA all costs of the response action not inconsistent with the NCP pursuant to Section XVI (Payments for Response Costs).

51. Nothing in the preceding Paragraph or in this Consent Decree shall be deemed to limit any authority of the United States a) to take all appropriate action to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, or b) to direct or order such action, or seek an order from the Court, to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site, subject to Section XXI (Covenants Not to Sue by Plaintiff).

XVI. PAYMENTS FOR RESPONSE COSTS

52. Payments for Future Response Costs.

a. Honeywell shall pay to EPA all Future Response Costs not inconsistent with the National Contingency Plan. On a periodic basis the United States will send Honeywell a bill requiring payment that includes a Regionally-prepared cost summary, which includes direct and indirect costs incurred by EPA and its contractors, and name of DOJ-prepared cost summary which reflects costs incurred by DOJ and its contractors, if any. Honeywell shall make all payments within 30 days of Honeywell's receipt of each bill requiring payment, except as otherwise provided in Paragraph 53. Honeywell shall make all payments required by this Paragraph by a certified or cashier's check or checks made payable to "EPA Hazardous Substance Superfund," referencing the name and address of the party making the payment, EPA Site/Spill ID Number A484, and DOJ Case Number 90-11-2-06699/2.

Honeywell shall send the check(s) to:

U.S. Environmental Protection Agency
Region 4 Superfund Receivables
P.O. Box 371099M
Pittsburgh, PA 15251

b. At the time of payment, Honeywell shall send notice that payment has been made to EPA and DOJ in accordance with Section XXVI (Notices ad Submissions), and by email to acctsreceivable.CINWD@epa.gov and to

EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, Ohio 45268

53. Honeywell may contest payment of any Future Response Costs under Paragraph 52 if it determines that the United States has made an accounting error or if it alleges that a cost item that is included represents costs that are inconsistent with the NCP. Such objection shall be made in writing within 30 days of receipt of the bill and must be sent to the United States pursuant to Section XXVI (Notices and Submissions). Any such objection shall specifically identify the contested Future Response Costs and the basis for objection. In the event of an objection, Honeywell shall within the thirty (30) day period pay all uncontested Future Response Costs to the United States in the manner described in Paragraph 52. Simultaneously, Honeywell shall establish an interest-bearing escrow account in a federally-insured bank duly chartered in the State of Florida and remit to that escrow account funds equivalent to the amount of the contested Future Response Costs. Honeywell shall send to the United States, as provided in Section XXVI (Notices and Submissions) a copy of the transmittal letter and check paying the uncontested Future Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement

showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Honeywell shall initiate the Dispute Resolution procedures in Section XIX (Dispute Resolution). If the United States prevails in the dispute, within five (5) days of the resolution of the dispute, Honeywell shall pay the sums due (with accrued interest) to the United States in the manner described in Paragraph 52. If Honeywell prevails concerning any aspect of the contested costs, Honeywell shall pay that portion of the costs (plus associated accrued interest) for which it did not prevail to the United States in the manner described in Paragraph 52; Honeywell shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XIX (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Honeywell's obligation to reimburse the United States for its Future Response Costs.

54. In the event that the payments required by Subparagraph 52 are not made within 30 days of Honeywell's receipt of the bill, Honeywell shall pay Interest on the unpaid balance. The Interest to be paid on Past Response Costs under this Paragraph shall begin to accrue on the Effective Date. The Interest on Future Response Costs shall begin to accrue on the date of the bill. The Interest shall accrue through the date of Honeywell's payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to Plaintiffs by virtue of Honeywell's failure to make timely payments under this Section including, but not limited to, payment of stipulated penalties pursuant to Paragraph 69. Honeywell shall make all payments required by this Paragraph in the manner described in Paragraph 52.

XVII. INDEMNIFICATION AND INSURANCE

55. Honeywell's Indemnification of the United States.

a. The United States does not assume any liability by entering into this agreement or by virtue of any designation of Honeywell as EPA's authorized representatives under Section 104(e) of CERCLA. Honeywell shall indemnify, save and hold harmless the United States and its officials, agents, employees, contractors, subcontractors, or representatives for or from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Honeywell, its officers, directors, employees, agents, contractors, subcontractors, and any persons acting on its behalf or under their control, in carrying out activities pursuant to this Consent Decree, including, but not limited to, any claims arising from any designation of Honeywell as EPA's authorized representatives under Section 104(e) of CERCLA. Further, Honeywell agrees to pay the United States all costs it incurs including, but not limited to, attorneys fees and other expenses of litigation and settlement arising from, or on account of, claims made against the United States based on negligent or other wrongful acts or omissions of Honeywell, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Decree. The United States shall not be held out as a party to any contract entered into by or on behalf of Honeywell in carrying out activities pursuant to this Consent Decree. Honeywell nor any such contractor shall be considered an agent of the United States.

b. The United States shall give Honeywell notice of any claim for which the United States plans to seek indemnification pursuant to Paragraph 55, and shall consult with Honeywell prior to settling such claim.

56. Honeywell waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Honeywell shall indemnify and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between Honeywell and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

57. No later than 15 days before commencing any on-site Work, Honeywell shall secure, and shall maintain until the first anniversary of EPA's Certification of Completion of the Remedial Action pursuant to Subparagraph 49(b) of Section XIV (Certification of Completion) comprehensive general liability insurance with limits of five million dollars, combined single limit, and automobile liability insurance with limits of five million dollars, combined single limit, naming the United States as an additional insured. In addition, for the duration of this Consent Decree, Honeywell shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of workers' compensation insurance for all persons performing the Work on behalf of Honeywell in furtherance of this Consent Decree. Prior to commencement of the Work under this Consent Decree, Honeywell shall provide to EPA certificates of such insurance and a copy of each insurance policy. Honeywell shall resubmit such certificates and copies of policies each year on the anniversary of the Effective Date. If Honeywell demonstrates by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to that contractor or subcontractor, Honeywell needs provide

only that portion of the insurance described above which is not maintained by the contractor or subcontractor.

XVIII. FORCE MAJEURE

58. "Force majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of Honeywell, of any entity controlled by Honeywell, or of Honeywell's contractors, that delays or prevents the performance of any obligation under this Consent Decree despite Honeywell's best efforts to fulfill the obligation. The requirement that Honeywell exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event (1) as it is occurring and (2) following the potential force majeure event, such that the delay is minimized to the greatest extent possible. "Force Majeure" does not include financial inability to complete the Work or a failure to attain the Performance Standards.

59. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, Honeywell shall notify orally EPA's Project Coordinator or, in his or her absence, EPA's Alternate Project Coordinator or, in the event both of EPA's designated representatives are unavailable, the Director of the Hazardous Waste Management Division, EPA Region 4, within fourteen (14) days of when Honeywell first knew that the event might cause a delay. Within fourteen (14) days thereafter, Honeywell shall provide in writing to EPA an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Honeywell's rationale for attributing such delay to a force majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of

Honeywell, such event may cause or contribute to an endangerment to public health, welfare or the environment. Honeywell shall include with any notice all available documentation supporting their claim that the delay was attributable to a force majeure. Failure to comply with the above requirements shall preclude Honeywell from asserting any claim of force majeure for that event for the period of time of such failure to comply, and for any additional delay caused by such failure. Honeywell shall be deemed to know of any circumstance of which Honeywell, any entity controlled by Honeywell, or Honeywell's contractors knew or should have known.

60. If EPA agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. If EPA, after a reasonable opportunity for review and comment by the State, does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify Honeywell in writing of its decision. If EPA agrees that the delay is attributable to a force majeure event, EPA will notify Honeywell in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

61. If Honeywell elects to invoke the dispute resolution procedures set forth in Section XIX (Dispute Resolution), it shall do so no later than 15 days after receipt of EPA's notice. In any such proceeding, Honeywell shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the

effects of the delay, and that Honeywell complied with the requirements of Paragraphs 59 and 60, above. If Honeywell carries this burden, the delay at issue shall be deemed not to be a violation by Honeywell of the affected obligation of this Consent Decree identified to EPA and the Court.

XIX. DISPUTE RESOLUTION

62. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree. However, the procedures set forth in this Section shall not apply to actions by the United States to enforce obligations of Honeywell that have not been disputed in accordance with this Section.

63. Any dispute which arises under or with respect to this Consent Decree shall in the first instance be the subject of informal negotiations between the parties to the dispute. The period for informal negotiations shall not exceed 20 days from the time the dispute arises, unless it is modified by written agreement of the parties to the dispute. The dispute shall be considered to have arisen when one party sends the other parties a written Notice of Dispute.

64. Statements of Position.

a. In the event that the parties cannot resolve a dispute by informal negotiations under the preceding Paragraph, then the position advanced by EPA shall be considered binding unless, within fifteen (15) days after the conclusion of the informal negotiation period, Honeywell invoke the formal dispute resolution procedures of this Section by serving on the United States a written Statement of Position on the matter in dispute, including, but not limited to, any factual data, analysis or opinion supporting that position and any supporting documentation relied upon by Honeywell. The Statement of Position shall specify Honeywell's position as to whether formal dispute resolution should proceed under Paragraphs 65 or 66.

b. Within thirty (30) days after receipt of Honeywell's Statement of Position, EPA will serve on Honeywell its Statement of Position, including, but not limited to, any factual data, analysis, or opinion supporting that position and all supporting documentation relied upon by EPA. EPA's Statement of Position shall include a statement as to whether formal dispute resolution should proceed under Paragraph 65 or 66. Within thirty (30) days after receipt of EPA's Statement of Position, Honeywell may submit a Reply.

c. If there is disagreement between EPA and Honeywell as to whether dispute resolution should proceed under Paragraph 65 or 66, the parties to the dispute shall follow the procedures set forth in the paragraph determined by EPA to be applicable. However, if Honeywell ultimately appeals to the Court to resolve the dispute, the Court shall determine which paragraph is applicable in accordance with the standards of applicability set forth in Paragraphs 65 or 66.

65. Formal dispute resolution for disputes pertaining to the selection or adequacy of any response action and all other disputes that are accorded review on the administrative record under applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without limitation: (1) the adequacy or appropriateness of plans, procedures to implement plans, or any other items requiring approval by EPA under this Consent Decree; and (2) the adequacy of the performance of response actions taken pursuant to this Consent Decree. Nothing in this Consent Decree shall be construed to allow any dispute by Honeywell regarding the validity of the ROD's provisions.

a. An administrative record of the dispute shall be maintained by EPA and shall contain all statements of position, including supporting documentation, submitted pursuant

to this Section. Where appropriate, EPA may allow submission of supplemental statements of position by the parties to the dispute.

b. The Director of the Waste Management Division, EPA Region 4, will issue a final administrative decision resolving the dispute based on the administrative record described in Paragraph 65(a). This decision shall be binding upon Honeywell, subject only to the right to seek judicial review pursuant to Paragraph 65(c) and (d).

c. Any administrative decision made by EPA pursuant to Paragraph 65(b) shall be reviewable by this Court, provided that a motion for judicial review of the decision is filed by Honeywell with the Court and served on all Parties within 10 days of receipt of EPA's decision. The motion shall include a description of the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Consent Decree. The United States may file a response to Honeywell's motion.

d. In proceedings on any dispute governed by this Paragraph, Honeywell shall have the burden of demonstrating that the decision of the Waste Management Division Director is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled pursuant to Paragraph 65(a).

66. Formal dispute resolution for disputes that neither pertain to the selection or adequacy of any response action nor are otherwise accorded review on the administrative record under applicable principles of administrative law, shall be governed by this Paragraph.

a. Following receipt of Honeywell's Statement of Position submitted pursuant to Paragraph 64, the Director of the Waste Management Division, EPA Region 4, will issue a final decision resolving the dispute. The Waste Management Division Director's decision

shall be binding on Honeywell unless, within 10 days of receipt of the decision, Honeywell files with the Court and serves on the parties a motion for judicial review of the decision setting forth the matter in dispute, the efforts made by the parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The United States may file a response to Honeywell's motion.

b. Notwithstanding Paragraph M of Section I (Background) of this Consent Decree, judicial review of any dispute governed by this Paragraph shall be governed by applicable principles of law.

67. The invocation of formal dispute resolution procedures under this Section shall not extend, postpone or affect in any way any obligation of Honeywell under this Consent Decree, not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 76. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Consent Decree. In the event that Honeywell does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section XX (Stipulated Penalties).

XX. STIPULATED PENALTIES

68. Honeywell shall be liable for stipulated penalties in the amounts set forth in Paragraphs 69 and 70 to the United States for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XVIII (Force Majeure). "Compliance" by Honeywell shall include completion of the activities under this Consent Decree or any work plan or other plan approved under this Consent Decree identified below in accordance with all applicable requirements of law, this Consent Decree, the SOW, and any plans

or other documents approved by EPA pursuant to this Consent Decree and within the specified time schedules established by and approved under this Consent Decree.

69. Stipulated Penalty Amounts - Work.

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Subparagraph 69(b):

Period of Noncompliance	Penalty Per Violation Per Day
1st through 14th day	$1,250.00
15th through 30th day	$2,500.00
31st day and beyond	$5,000.00

b. Compliance Milestones.

The Compliance milestones include (i) both the timely and adequate submittal of, as defined in Section XI (EPA Approval of Plans and Other Submissions), and substantial compliance with the following documents and substantive requirements:

(1) Draft Preliminary Design Report specified in the SOW;

(2) Final Preliminary Design Report as specified in the SOW;

(3) Draft Remedial Design as specified in the SOW

(4) Final Remedial Design as specified in the SOW

(5) Draft RA Work Plan as specified in the SOW;

(6) Final RA Work Plan as specified in the SOW;

(7) Prefinal Construction Inspection Report as specified in the SOW:

(8) Final Construction Plan as specified in the SOW;

(9) Draft Remedial Action Report as specified in the SOW;

(10) Final Remedial Action Report as specified in the SOW;

(11) Draft O & M Plan as specified in the SOW;

(12) Final O & M Plan as specified in the SOW;

(13) Draft Performance Standards Verification Plan as specified in the SOW;

(14) Final Performance Standards Verification Plan as specified in the SOW.(15) Implementation of the Final Remedial Design and Final Remedial Action Work Plan;

(16) Implementation of further response actions and additional work pursuant to Sections VI and VII;

(17) Payment of all monies owed under Section XVI; and

(18) Establishment of a Performance Guarantee as required by Section XIII.

70. Stipulated Penalty Amounts - Reports.

a. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports or other written documents pursuant to Section X (Reporting Requirements):

Period of Noncompliance	Penalty Per Violation Per Day
1st through 14th day	$500.00
15th through 30th day	$1,500.00
31st day and beyond	$3,000.00

71. In the event that EPA assumes performance of a portion or all of the Work pursuant to Paragraph 85 of Section XXI (Covenants Not to Sue by Plaintiff), Honeywell shall be liable for a stipulated penalty in the amount of $200,000.

72. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: (1) with respect to a deficient submission under Section XI (EPA Approval of Plans and Other Submissions), during the period, if any, beginning on the 31st day after EPA's receipt of such submission until the date that EPA notifies Honeywell of any deficiency; (2) with respect to a decision by the Director of the Waste Management Division, EPA Region 4, under Paragraph 65(b) or 66(a) of Section XIX (Dispute Resolution), during the period, if any, beginning on the 21st day after the date that Honeywell's reply to EPA's Statement of Position is received until the date that the Director issues a final decision regarding such dispute; or (3) with respect to judicial review by this Court of any dispute under Section XIX (Dispute Resolution), during the period, if any, beginning on the 31st day after the Court's receipt of the final submission regarding the dispute until the date that the Court issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Decree.

73. Following EPA's determination that Honeywell has failed to comply with a requirement of this Consent Decree, EPA may give Honeywell written notification of the same and describe the noncompliance. EPA may send Honeywell a written demand for the payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified Honeywell of a violation.

74. All penalties accruing under this Section shall be due and payable to the United States within 30 days of Honeywell's receipt from EPA of a demand for payment of the penalties, unless Honeywell invoke the Dispute Resolution procedures under Section XIX (Dispute

Resolution). All payments to the United States under this Section shall be paid by certified or cashier's check(s) made payable to "EPA Hazardous Substances Superfund," shall be mailed to U.S. Environmental Protection Agency, Region 4 Superfund Receivables, P.O. Box 371099M, Pittsburgh, PA 15251, shall indicate that the payment is for stipulated penalties, and shall reference the EPA Region and Site/Spill ID A484, the DOJ Case Number 90-11-2-06699/2, and the name and address of the party making payment. Copies of check(s) paid pursuant to this Section, and any accompanying transmittal letter(s), shall be sent to the United States as provided in Section XXVI (Notices and Submissions), and by email to acctsreceivable.CINWD@epa.gov and to:

EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, Ohio 45268

75. The payment of penalties shall not alter in any way Honeywell's obligation to complete the performance of the Work required under this Consent Decree. .

76. Penalties shall continue to accrue as provided in Paragraph 72 during any dispute resolution period, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of EPA that is not appealed to this Court, accrued penalties determined to be owing shall be paid to EPA within 15 days of the agreement or the receipt of EPA's decision or order;

b. If the dispute is appealed to this Court and the United States prevails in whole or in part, Honeywell shall pay all accrued penalties determined by the Court to be owed to EPA within 60 days of receipt of the Court's decision or order, except as provided in Subparagraph c below;

c. If the District Court's decision is appealed by any Party, Honeywell shall pay all accrued penalties determined by the District Court to be owing to the United States into an interest-bearing escrow account within 60 days of receipt of the Court's decision or order. Penalties shall be paid into this account as they continue to accrue, at least every 60 days. Within 15 days of receipt of the final appellate court decision, the escrow agent shall pay the balance of the account to EPA or to Honeywell to the extent that it prevails.

77. If Honeywell fails to pay stipulated penalties when due, the United States may institute proceedings to collect the penalties, as well as interest. Honeywell shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 74.

78. Nothing in this Consent Decree shall be construed as prohibiting, altering, or in any way limiting the ability of the United States to seek any other remedies or sanctions available by virtue of Honeywell's violation of this Decree or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Section 122(l) of CERCLA, provided, however, that the United States shall not seek civil penalties pursuant to Section 122(l) of CERCLA for any violation for which a stipulated penalty is provided herein, except in the case of a willful violation of the Consent Decree.

79. Notwithstanding any other provision of this Section, the United States may, in its unreviewable discretion, waive any portion of stipulated penalties that have accrued pursuant to this Consent Decree.

XXI. COVENANTS NOT TO SUE BY PLAINTIFF

80. In consideration of the actions that will be performed and the payments that will be made by Honeywell under the terms of the Consent Decree, and except as specifically provided

in Paragraphs 81 (United States' Pre-Certification Reservations), 82 (United States' Post-Certification Reservations), 83 (Information and Conditions Known to EPA), and 84 (General Reservation of Rights) of this Section, the United States covenants not to sue or to take administrative action against Honeywell pursuant to Sections 106 and 107(a) of CERCLA relating to the Site. Except with respect to future liability, these covenants not to sue shall take effect upon the receipt by EPA of the payments required by Paragraph 52(a) of Section XVI (Payments for Response Costs). With respect to future liability, these covenants not to sue shall take effect upon Certification of Completion of Remedial Action by EPA pursuant to Paragraph 49(b) of Section XIV (Certification of Completion). These covenants not to sue are conditioned upon the satisfactory performance by Honeywell of its obligations under this Consent Decree. These covenants not to sue extend only to Honeywell and do not extend to any other person.

81. United States' Pre-Certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Honeywell

a. to perform further response actions relating to the Site, or

b. to reimburse the United States for additional costs of response if, prior to Certification of Completion of the Remedial Action:

(1) conditions at the Site, previously unknown to EPA, are discovered, or

(2) information, previously unknown to EPA, is received, in whole or in part, and EPA determines that these previously unknown conditions or information together with

any other relevant information indicates that the Remedial Action is not protective of human health or the environment.

82. United States' Post-Certification Reservations. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action, or to issue an administrative order seeking to compel Honeywell

a. to perform further response actions relating to the Site, or

b. to reimburse the United States for additional costs of response if, subsequent to Certification of Completion of the Remedial Action:

(1) conditions at the Site, previously unknown to EPA, are discovered, or

(2) information, previously unknown to EPA, is received, in whole or in part, and EPA determines that these previously unknown conditions or this information together with other relevant information indicate that the Remedial Action is not protective of human health or the environment.

83. Information and Conditions Known to EPA. For purposes of Paragraph 81, the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date the ROD was signed and set forth in the Record of Decision for the Site and the administrative record supporting the Record of Decision. For purposes of this Paragraph, the information and the conditions known to EPA shall include only that information and those conditions known to EPA as of the date of Certification of Completion of the Remedial Action and set forth in the Record of Decision, the administrative record supporting the Record of Decision, the post-ROD administrative record, or in any information

received by EPA pursuant to the requirements of this Consent Decree prior to Certification of Completion of the Remedial Action.

84. General reservations of rights. The United States reserves, and this Consent Decree is without prejudice to, all rights against Honeywell with respect to all matters not expressly included within Plaintiff's covenant not to sue. Notwithstanding any other provision of this Consent Decree, the United States reserves all rights against Honeywell with respect to:

a. claims based on a failure by Honeywell to meet a requirement of this Consent Decree;

b. liability arising from the past, present, or future disposal, release, or threat of release of Waste Material outside of the Site;

c. liability based upon Honeywell's ownership or operation of the Site, or upon Honeywell's transportation, treatment, storage, or disposal, or the arrangement for the transportation, treatment, storage, or disposal of Waste Material at or in connection with the Site, other than as provided in the ROD, the Work, or otherwise ordered by EPA, after signature of this Consent Decree by Honeywell;

d. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

e. criminal liability;

f. liability for violations of federal or state law which occur during or after implementation of the Remedial Action; and

g. liability, prior to Certification of Completion of the Remedial Action, for additional response actions that EPA determines are necessary to achieve Performance Standards,

but that cannot be required pursuant to Paragraph 13 (Modification of the SOW or Related Work Plans).

85. Work Takeover.

a. In the event EPA determines that Honeywell has (i) ceased implementation of any portion of the Work, or (ii) are seriously or repeatedly deficient or late in their performance of the Work, or (iii) are implementing the Work in a manner which may cause an endangerment to human health or the environment, EPA may issue a written notice ("Work Takeover Notice") to the Honeywell. Any Work Takeover Notice issued by EPA will specify the grounds upon which such notice was issued and will provide a period of 10 days within which to remedy the circumstances giving rise to EPA's issuance of such notice.

b. If, after expiration of the 10-day notice period specified in Paragraph 85(a), Honeywell has not remedied to EPA's satisfaction the circumstances giving rise to EPA's issuance of the relevant Work Takeover Notice, EPA may at any time thereafter assume the performance of all or any portions of the Work as EPA deems necessary ("Work Takeover"). EPA shall notify Honeywell in writing (which writing may be electronic) if EPA determines that implementation of a Work Takeover is warranted under this Paragraph 85(b).

c. Honeywell may invoke the procedures set forth in Section XIX (Dispute Resolution), Paragraph 62, to dispute EPA's implementation of a Work Takeover under Paragraph 85(b). However, notwithstanding Honeywell's invocation of such dispute resolution procedures, and during the pendency of any such dispute, EPA may in its sole discretion commence and continue a Work Takeover under Paragraph 85(b) until the earlier of (i) the date that Honeywell's remedy, to EPA's satisfaction, the circumstances giving rise to EPA's issuance of the relevant

Work Takeover Notice or (ii) the date that a final decision is rendered in accordance with Section XIX (Dispute Resolution), Paragraph 62, requiring EPA to terminate such Work Takeover.

d. After commencement and for the duration of any Work Takeover, EPA shall have immediate access to and benefit of any performance guarantee(s) provided pursuant to Section XIII (Performance Guarantee), in accordance with the provisions of Paragraph 46 of that Section. If and to the extent that EPA is unable to secure the resources guaranteed under any such performance guarantee(s) and Honeywell fails to remit a cash amount up to but not exceeding the estimated cost of the remaining Work to be performed, all in accordance with the provisions of Paragraph 46, any unreimbursed costs incurred by EPA in performing Work under the Work Takeover shall be considered Future Response Costs that Honeywell shall pay pursuant to Section XVI (Payment for Response Costs).

86. Notwithstanding any other provision of this Consent Decree, the United States retains all authority and reserves all rights to take any and all response actions authorized by law.

XXII. COVENANTS BY HONEYWELL

87. Covenant Not to Sue. Subject to the reservations in Paragraph 88, Honeywell hereby covenants not to sue and agree not to assert any claims or causes of action against the United States with respect to the Site or this Consent Decree, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund (established pursuant to the Internal Revenue Code, 26 U.S.C. § 9507) through CERCLA Sections 106(b)(2), 107, 111, 112, 113 or any other provision of law;

b. any claims against the United States, including any department, agency or instrumentality of the United States under CERCLA Sections 107 or 113 related to the Site, or

c. any claims arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law.

d. Except as provided in Paragraph 90 (Waiver of Claims Against De Micromis Parties), and Paragraph 96 (Waiver of Claim-Splitting Defenses), these covenants not to sue shall not apply in the event that the United States brings a cause of action or issues an order pursuant to the reservations set forth in Paragraphs 81, 82, 83, and 84(b)- (d) and (g), but only to the extent that Honeywell's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

88. Honeywell reserves, and this Consent Decree is without prejudice to, claims against the United States, subject to the provisions of Chapter 171 of Title 28 of the United States Code, for money damages for injury or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any employee of the United States while acting within the scope of his office or employment under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred. However, any such claim shall not include a claim for any damages caused, in whole or in part, by the act or omission of any person, including any contractor, who is not a federal employee as that term is defined in 28 U.S.C. § 2671; nor shall any such claim include a claim based on EPA's selection of response actions, or the oversight or approval of Honeywell's plans or activities. The foregoing applies only to claims which are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA.

89. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

90. Honeywell agrees not to assert any claims and to waive all claims or causes of action that it may have for all matters relating to the Site, including for contribution, against any person where the person's liability to Honeywell with respect to the Site is based solely on having arranged for disposal or treatment, or for transport for disposal or treatment, of hazardous substances at the Site, or having accepted for transport for disposal or treatment of hazardous substances at the Site, if:

a. The materials contributed by such person to the Site containing hazardous substances did not exceed the greater of (i) 0.002% of the total volume of waste at the Site, or (ii) 110 gallons of liquid materials or 200 pounds of solid materials.

b. This waiver shall not apply to any claim or cause of action against any person meeting the above criteria if EPA has determined that the materials contributed to the Site by such person contributed or could contribute significantly to the costs of response at the Site. This waiver also shall not apply with respect to any defense, claim, or cause of action that a Honeywell may have against any person if such person asserts a claim or cause of action relating to the Site against such Honeywell.

91. Honeywell agrees not to seek judicial review of the final rule listing the Site on the NPL based on a claim that changed Site conditions that resulted from the performance of the Work in any way affected the basis for listing the Site.

XXIII. EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

92. Except as provided in Paragraph 90 (Waiver of Claims Against De Micromis Parties), nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this decree may have under applicable law. Except as provided in Paragraph 90 (Waiver of Claims Against De Micromis Parties), each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto.

93. The Parties agree, and by entering this Consent Decree this Court finds, that Honeywell is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by CERCLA Section 113(f)(2), 42 U.S.C. § 9613(f)(2) for matters addressed in this Consent Decree. The "matters addressed" in this Consent Decree are the Work, and Future Response Costs. The "matters addressed" in this Consent Decree do not include those response costs or response actions as to which the United States has reserved its rights under this Consent Decree (except for claims for failure to comply with this Decree), in the event that the United States asserts rights against Honeywell coming within the scope of such reservations.

94. Honeywell agrees that with respect to any suit or claim for contribution it brings for matters related to this Consent Decree it will notify the United States in writing no later than 60 days prior to the initiation of such suit or claim.

95. Honeywell also agrees that with respect to any suit or claim for contribution brought against it for matters related to this Consent Decree it will notify in writing the United

States within 10 days of service of the complaint upon it. In addition, Honeywell shall notify the United States within 10 days of service or receipt of any Motion for Summary Judgment and within 10 days of receipt of any order from a court setting a case for trial.

96. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief, recovery of response costs, or other appropriate relief relating to the Site, Honeywell shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenants not to sue set forth in Section XXI (Covenants Not to Sue by Plaintiff).

XXIV. ACCESS TO INFORMATION

97. Honeywell shall provide to EPA, upon request, copies of all documents and information within their possession or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Consent Decree, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Honeywell shall also make available to EPA, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

98. Business Confidential and Privileged Documents.

a. Honeywell may assert business confidentiality claims covering part or all of the documents or information submitted to Plaintiff under this Consent Decree to the extent

permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when they are submitted to EPA, or if EPA has notified Honeywell that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such documents or information without further notice to Honeywell.

b. Honeywell may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Honeywell asserts such a privilege in lieu of providing documents, it shall provide the Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the contents of the document, record, or information: and (6) the privilege asserted by Honeywell. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

99. No claim of confidentiality shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at or around the Site.

XXV. RETENTION OF RECORDS

100. Until 10 years after Honeywell's receipt of EPA's notification pursuant to Paragraph 49(b) of Section XIV (Certification of Completion of the Work), Honeywell shall

preserve and retain all non-identical copies of records and documents (including records or documents in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to its liability under CERCLA with respect to the Site, provided, however, that Honeywell who is potentially liable as owners or operators of the Site must retain, in addition, all documents and records that relate to the liability of any other person under CERCLA with respect to the Site. Honeywell must also retain, and instruct its contractors and agents to preserve, for the same period of time specified above all non-identical copies of the last draft or final version of any documents or records (including documents or records in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work, provided, however, that Honeywell (and its contractors and agents) must retain, in addition, copies of all data generated during the performance of the Work and not contained in the aforementioned documents required to be retained. Each of the above record retention requirements shall apply regardless of any corporate retention policy to the contrary.

101. At the conclusion of this document retention period, Honeywell shall notify the United States at least 90 days prior to the destruction of any such records or documents, and, upon request by the United States, Honeywell shall deliver any such records or documents to EPA. Honeywell may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Honeywell asserts such a privilege, it shall provide the Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the

privilege asserted by Honeywell. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

102. Honeywell hereby certifies individually that, to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information (other than identical copies) relating to its potential liability regarding the Site since notification of potential liability by the United States or the State or the filing of suit against it regarding the Site and that it has fully complied with any and all EPA requests for information pursuant to Section 104(e) and 122(e) of CERCLA, 42 U.S.C. 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. 6927.

XXVI. NOTICES AND SUBMISSIONS

103. Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice of a change to the other Parties in writing. All notices and submissions shall be considered effective upon receipt, unless otherwise provided. Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, EPA, and Honeywell, respectively.

As to the United States:

BRUCE GELBER
Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611
Re: DJ # 90-11-2-06699/2

and	FRANKLIN E. HILL Director, Superfund Division United States Environmental Protection Agency Region 4 Atlanta Federal Center 61 Forsyth Street, S.W. Atlanta, Georgia 30303-8960
As to EPA:	WILLIAM C. DENMAN, P.E. EPA Project Coordinator United States Environmental Protection Agency Region 4 Atlanta Federal Center 61 Forsyth Street, S.W. Atlanta, Georgia 30303-8960
EPA Alternate Project Coordinator:	JAN B. ROGERS EPA Alternate Project Coordinator United States Environmental Protection Agency Region 4- South Florida Office 400 North Congress Avenue Suite 120 West Palm Beach, Florida 33401
As to the EPA Regional Superfund Records Program Manager:	DEBBIE JORDON United States Environmental Protection Agency Region 4 Atlanta Federal Center 61 Forsyth Street, S.W. Atlanta, Georgia 30303-8960
As to Honeywell:	MARK KAMILOW Project Coordinator. Honeywell International Inc. 101 Columbia Road Morristown, NJ 07960-4640

XXVII. EFFECTIVE DATE

104. The effective date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court, except as otherwise provided herein.

XXVIII. RETENTION OF JURISDICTION

105. This Court retains jurisdiction over both the subject matter of this Consent Decree and Honeywell for the duration of the performance of the terms and provisions of this Consent Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the construction or modification of this Consent Decree, or to effectuate or enforce compliance with its terms, or to resolve disputes in accordance with Section XIX (Dispute Resolution) hereof.

XXIX. APPENDICES

106. The following appendices are attached to and incorporated into this Consent Decree:

"Appendix A" is the ROD.

"Appendix B" is the SOW.

XXX. COMMUNITY RELATIONS

107. Honeywell shall update the existing Community Relations Plan and submit it to EPA consistent with Task II of the SOW. If determined necessary by EPA, Honeywell shall again update the Community Relations Plan and submit it to EPA consistent with Task III of the SOW. EPA will determine the appropriate role for Honeywell under the Plan. Honeywell shall also cooperate with EPA in providing information regarding the Work to the public. As requested by EPA, Honeywell shall participate in the preparation of such information for dissemination to the public and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site.

108. Within 30 days of a request by EPA, Honeywell shall provide a draft Technical Assistance Plan (TAP) in accordance with Task 1 of the SOW. Under the TAP, Honeywell shall

provide and administer up to $50,000 of its own funds, inclusive of any start up costs, to be used by a Qualified Community Group to hire independent technical advisors during the Work conducted pursuant to this Consent Decree. The TAP shall state that Honeywell will provide and administer any additional amounts needed if EPA, in its discretion, determines that the Qualified Community Group has demonstrated such a need; provided, however, that the total amount of TAP funds provided by Honeywell shall not exceed $80,000. EPA may approve, disapprove, require revisions to, or modify the draft TAP in whole or in part. If EPA requires revisions, Honeywell shall submit a revised TAP within 30 days of receipt of EPA's notification of the required revisions. Honeywell shall implement the TAP as approved in writing by EPA. Once approved, or approved with modifications, the TAP and any subsequent modifications shall be incorporated into and become fully enforceable under this Consent Decree.

XXXI. MODIFICATION

109. Schedules specified in this Consent Decree for completion of the Work may be modified by agreement of EPA and Honeywell. All such modifications shall be made in writing.

110. Except as provided in Paragraph 13 (Modification of the SOW or Related Work Plans), no material modifications shall be made to the SOW without written notification to and written approval of the United States, Honeywell, and the Court, if such modifications fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R. 300.435(c)(2)(B)(ii). Prior to providing its approval to any modification, the United States will provide the State with a reasonable opportunity to review and comment on the proposed modification. Modifications to the SOW that do not materially alter that document, or material modifications to the SOW that do not fundamentally alter the basic features of the selected remedy within the meaning of 40 C.F.R.300.435(c)(2)(B)(ii), may be made by written agreement

between EPA, after providing the State with a reasonable opportunity to review and comment on the proposed modification, and Honeywell.

111. Nothing in this Decree shall be deemed to alter the Court's power to enforce, supervise or approve modifications to this Consent Decree.

XXXII. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

112. This Consent Decree shall be lodged with the Court for a period of not less than thirty (30) days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations which indicate that the Consent Decree is inappropriate, improper, or inadequate. Honeywell consents to the entry of this Consent Decree without further notice.

113. If for any reason the Court should decline to approve this Consent Decree in the form presented, this agreement is voidable at the sole discretion of any Party and the terms of the agreement may not be used as evidence in any litigation between the Parties.

XXXIII. SIGNATORIES/SERVICE

114. Each undersigned representative of a Honeywell to this Consent Decree and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such Party to this document.

115. Honeywell hereby agrees not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States has notified Honeywell in writing that it no longer supports entry of the Consent Decree.

116. Honeywell shall identify, on the attached signature page, the name, address and telephone number of an agent who is authorized to accept service of process by mail on behalf of that Party with respect to all matters arising under or relating to this Consent Decree. Honeywell hereby agrees to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons. The parties agree that Honeywell need not file an answer to the complaint in this action unless or until the court expressly declines to enter this Consent Decree.

XXXIV. FINAL JUDGMENT

117. This Consent Decree and its appendices constitute the final, complete, and exclusive agreement and understanding among the parties with respect to the settlement embodied in the Consent Decree. The parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Consent Decree.

118. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment between and among the United States and Honeywell. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

SO ORDERED THIS __ DAY OF _____, 20__.

_____

United States District Judge

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Honeywell International, Inc , relating to the Solitron Devices Superfund Site.

FOR THE UNITED STATES OF AMERICA

10-08-07
Date

ELLEN M. MAHAN
Deputy Section Chief
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
Washington, D.C. 20530

10-03-07
Date

CHERYL L. SMOUT
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044-7611

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Honeywell International Inc., relating to the Solitron Devices Superfund Site.

FOR THE U.S. EPA

9/27/07
Date

FRANKLIN E. HILL
Director, Superfund Division
U.S. Environmental Protection Agency
Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960

9/27/07
Date

TERESA MANN
Associate Regional Counsel
U.S. Environmental Protection Agency
Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. Honeywell International Inc., relating to the Solitron Devices Superfund Alternative Site.

FOR HONEYWELL INTERNATIONAL INC:

DAVID WICKERSHAM
Director, Remediation and Eval. Services
Honeywell International Inc.
101 Columbia Road
Morristown, NJ 07960-4640

Agent Authorized to Accept Service on Behalf of Above-signed Party:

Name (print): Thomas Byrne (AB-2)

Title: Associate General Counsel

Address: 101 Columbia Road
Morristown, NJ 07960

Phone Number: 973-455-2775

10141360

APPENDIX A

RECORD OF DECISION

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

SOLITRON DEVICES SITE

RIVIERA BEACH, PALM BEACH COUNTY, FLORIDA

PREPARED BY

U. S. ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA, GEORGIA

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SOLITRON DEVICES SITE RECORD OF DECISION

PART 1 : DECLARATION

SITE NAME AND LOCATION

Solitron Devices Site
Riviera Beach, Palm Beach County, Florida

EPA CERCIS ID # FLD 032845778

STATEMENT OF BASIS AND PURPOSE

This decision document (Record of Decision) presents the Selected Remedy for the Solitron Devices Site in Riviera Beach, Palm Beach County, Florida, and was developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C. § 9601 et seq., and to the extent practicable, the National Contingency Plan (NCP), 40 CFR Part 300.

This decision is based on the administrative record for the Solitron Devices Site. The State of Florida, as represented by the Southeast District Office of the Florida Department of Environmental Protection (FDEP), has reviewed the reports which are included in the Administrative Record for the Solitron Devices Site. In accordance with 40 CFR § 300.430, FDEP, as the support agency, has provided the U.S. Environmental Protection Agency (EPA) with input during the remedial selection process. The FDEP Southeast District Waste Cleanup Section agrees that the selected remedy provides reasonable assurances to be protective of human health and the environment.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Solitron Devices Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This action is the first and final action planned for the Site. This action addresses soil and ground water contamination at the Site and calls for the implementation of response measures which will protect human health and the environment. The selected remedy includes removal of chromium and arsenic contaminated soil; extraction of contaminated ground water and treatment by air stripping; re-injection of treated ground water to the aquifer; and infusion of oxygen into the re-injected ground water to enhance biodegradation.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy satisfies the statutory preference for treatment as a principal element and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. Because this remedial action will allow for unlimited use and unrestricted exposure, statutory five-year reviews of the remedy are not required. However, since the remedy will require more than five years to implement, and attainment of remedial action objectives will take longer than five years to complete, policy reviews should be conducted.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations, Section 7.2, page 37.
- Baseline risk represented by the chemicals of concern, Section 7.5, page 52.
- Cleanup levels established for chemicals of concern and the basis for these levels, Section 8, page 58.
- How source materials constituting principal threats are addressed, Section 11, page 84.
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and ROD, Section 6, page 36.
- Potential land and ground-water use that will be available at the Site as a result of the Selected Remedy, Section 12.4, page 91.
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected, Section 12.3, page 90.
- Key factors that led to selecting the remedy, Section 12.1, page 90.

AUTHORIZING SIGNATURE

12/17/04

WINSTON A. SMITH
DIRECTOR
WASTE MANAGEMENT DIVISION

DATE

PART 2 : DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

The Solitron Devices Site (the Site) is located at 1177 Blue Heron Boulevard in Riviera Beach, Palm Beach County, Florida (Figure 1-1). The National Superfund database identification number for the Solitron Devices Site is FLD032845778. The U.S. Environmental Protection Agency (EPA) is the lead agency for developing and implementing a remedy for the cleanup at the Site. The Southeast District Office of the Florida Department of Environmental Protection (FDEP), as the support agency representing the State of Florida, has reviewed all supporting documentation and provided input to EPA during the remedial selection process.

The Solitron Devices Site is situated in a mixed industrial, commercial, and residential area of Riviera Beach on the south side of Blue Heron Boulevard between Avenue P and a north-south trending canal just west of Australian Avenue. The Site is located less than one mile southwest of the Riviera Beach water treatment plant along Blue Heron Boulevard. The former Solitron property encompasses approximately 8.65 acres, including two buildings situated on the northern and southern portions of the property. The buildings, constructed in stages over a period of time from 1960 through the early 1980's, were previously used for the production of electronic components for the defense and space industries until 1992.

Operations were initiated by Honeywell in March 1960 as a manufacturer of electronic components for the defense and space industries. In January 1965, Solitron Devices, Inc. (Solitron) assumed ownership and continued operations at the facility. Shortly following the ownership change, Solitron expanded the existing facility by approximately 30 percent. Solitron added an additional 250,000 square feet building south of the original building in the early 1980's, and transferred operations in the north building to the south building in 1984. Operations continued in the south building until January 1992, when Solitron ceased operations and filed for bankruptcy protection.

Heavy metals and organic solvents were commonly used during the facilities operations. Industrial wastewater from the plant was discharged to the Riviera Beach sewer system. Operations included assembly areas, precious and non-precious metal brazing, and electroplating. The facility is no longer used for manufacturing activities. The south building of the property was sold by Solitron in 1995 and is currently being rented to commercial occupants. The parcel on which the southern building is located, was investigated and found to be clean; therefore, the Site is considered to be only the north parcel and building. The Site layout is illustrated on Figure 1-2.

The property is fenced and has two access gates. These gates are located on the eastern and western sides of the building; however, the gates are typically unlocked with no attendant present, in order to provide access to the southern building.

FIGURE 1-1. SITE LOCATION MAP

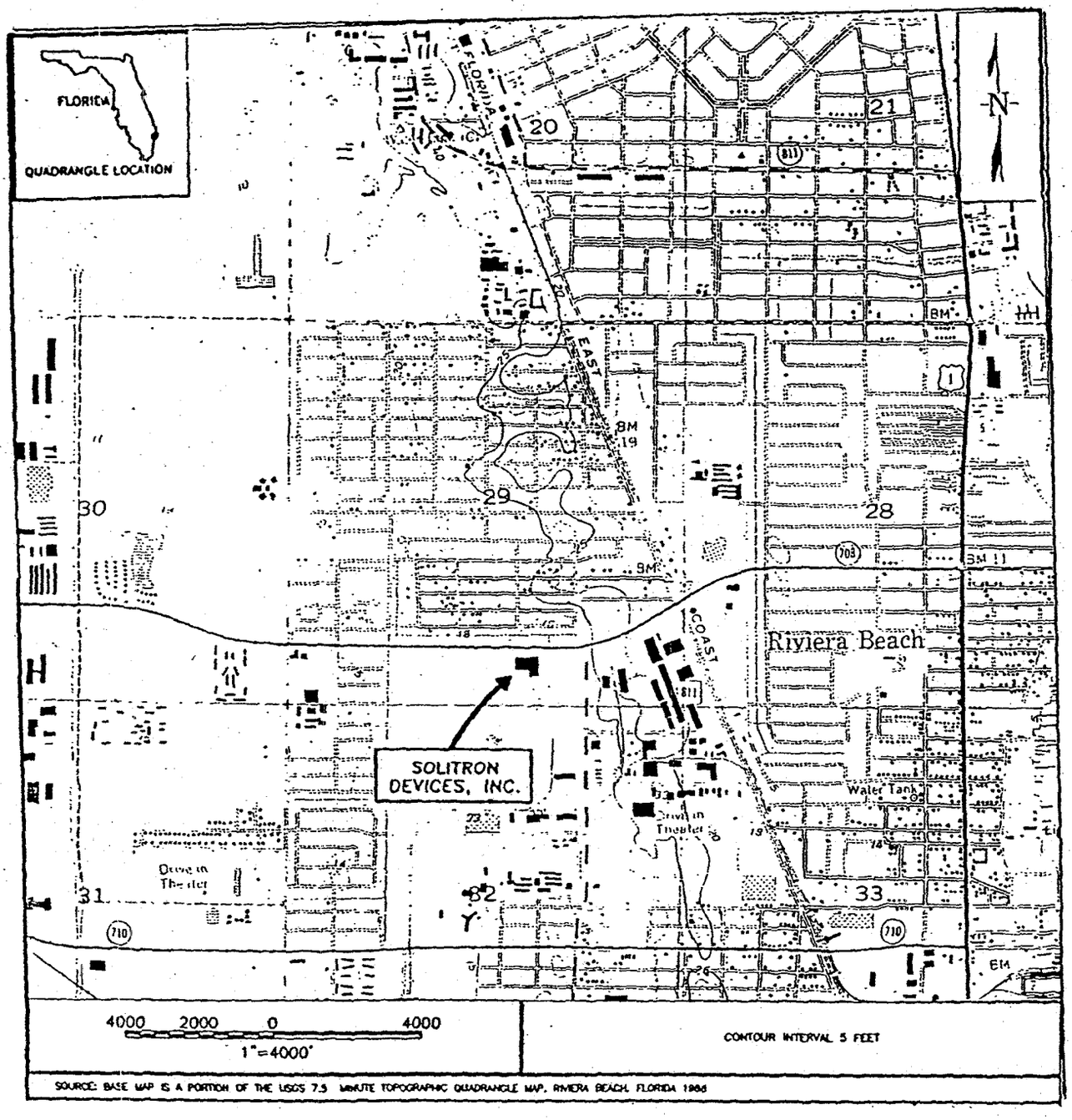
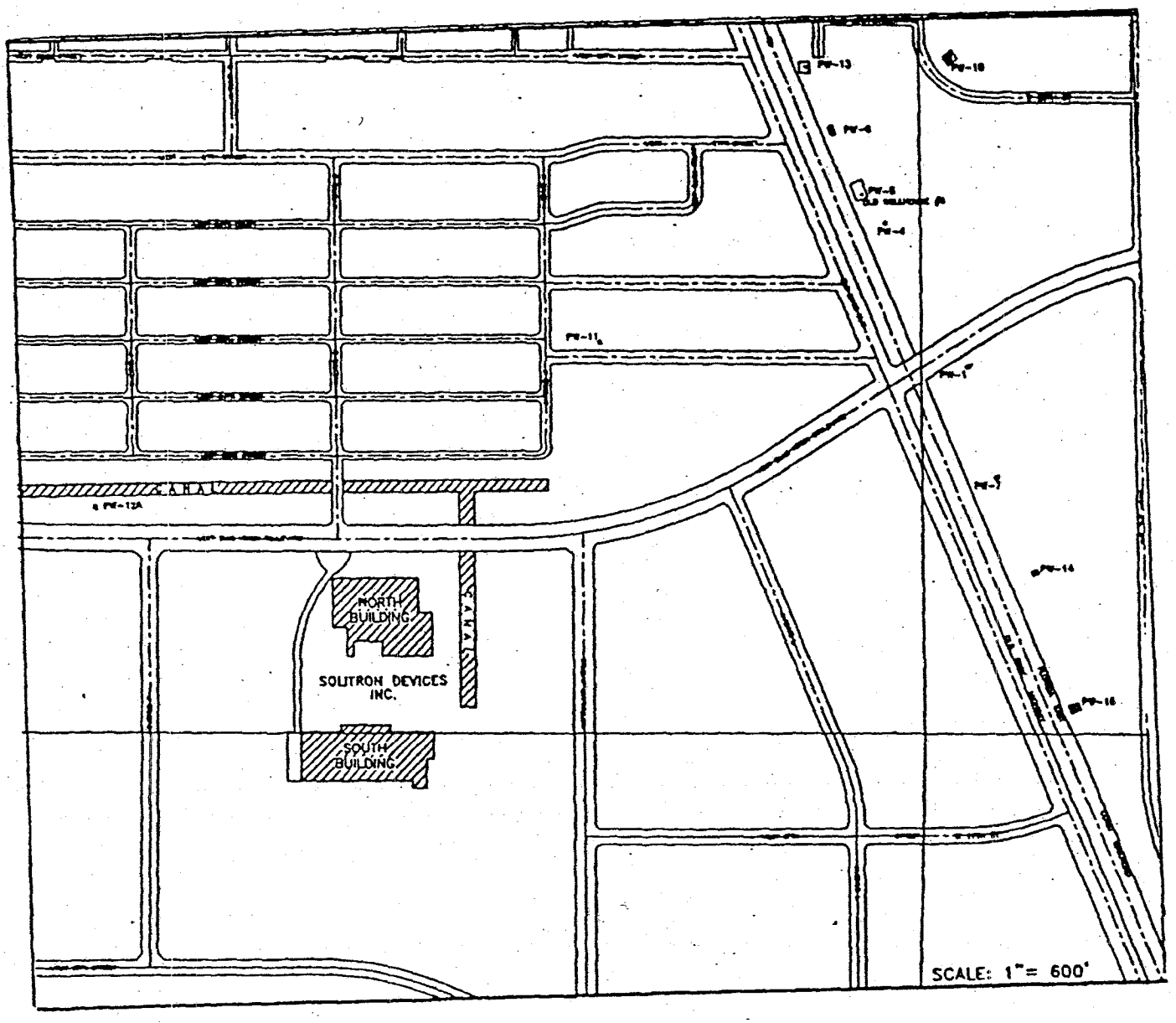


FIGURE 1-2. SITE PLAN



2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

On-site operations at the Site were initiated by Honeywell Inc. in March 1960 as a manufacturer of electronic components for the defense and space industries. In 1965, Solitron Devices, Inc. assumed ownership and continued operations at the Site, with emphasis on production. The potential corrosivity of the wastewater effluent from the Site was identified as early as 1967. Additional neutralization of Solitron's wastewater effluent and an automated wastewater neutralization system was installed in late 1969 or early 1970. In 1969, personnel from the City of Riviera Beach identified corrosive damage to a sewer manhole located in the City right of way on Blue Heron Boulevard at Avenue O, northwest of the Solitron facility. In March 1970, the manhole was patched by replacing the bottom of the manhole and stabilizing the soils around the base of the manhole. In addition, 170 feet of 10" pipe from the manhole to Lift Station #2 (LS#2) was also replaced. The lift station was replaced in 1971 and again in 2002. The lift station has been identified as the likely point of discharge for significant amounts of contamination from the Site.

In August 1981, the EPA conducted a ground water survey of potable water supplies in the south Florida area. During this survey, chlorinated solvents (trichloroethane, 1,2-dichloroethane, vinyl chloride, and chlorobenzene) were detected in two public supply wells in the City of Riviera Beach. A re-sample of the public supply wells in July 1982 indicated increasing levels of chlorinated solvents in several public wells.

In July 1983, FDEP, formerly the Florida Department of Environmental Regulation, performed a hazardous waste compliance inspection of the Solitron Devices, Inc property. The inspection was initiated because of an anonymous complaint regarding leaking hazardous waste drums at the facility. The inspection did not identify leaking drums; however, other violations were noted by the inspectors. The violations included improper labeling and storage of waste, no waste analysis, insufficient aisle space, storage over 90 days, and corroding drums.

In November 1984, the Southeast District Office of the FDEP requested that the FDEP Ground Water Section conduct field investigations to determine the type and extent of ground water contamination resulting in the drinking water source contamination observed by EPA in 1981.

The FDEP field study was conducted between February and May 1985. A total of thirty ground water monitoring wells were installed in eleven different locations. The results of the investigation were reported in a September 1985 report entitled "Riviera Beach Wellfield Contamination". This report pointed to extensive solvent contamination from at least two major potential sources, including Solitron Devices, Inc. and Trans Circuits, Inc. Ground water contaminants detected near the Solitron Site included 1,2-dichloroethane, ethyl benzene, trans-1,2-dichloroethene, chlorobenzene, vinyl chloride, and "other purgeables."

On February 13, 1985, the EPA Region 4 Field Investigation Team (FIT) performed a Site Screening Investigation (SSI) at the Solitron facility. During the investigation, the FIT collected environmental samples consisting of soil, sediment, and water. Analysis of the water sample collected in front of the north building detected the presence of trans-1,2-dichloroethene, trichloroethene, and tetrachloromethane, as well as several inorganic analytes. Chloroform was detected in the water sample collected from the culvert on the east side of the Site. Organic analysis of the soil and sediment samples collected from the east side of the north building and the water discharge pipe, respectively, detected the presence of trichloroethene, and tetrachloromethane, polynuclear aromatic hydrocarbons (PAHs) and unidentified compounds. The site investigation report identified the following potential source areas: a contaminated water discharge pipe, and a partially buried tank. Drum storage areas were also identified during the investigation.

In 1986, the City of Riviera Beach Water Department began designing an air stripping systems to be placed on the blended Riviera Beach water supply to mitigate ground water contamination by organic contaminants suspected to have been generated by Solitron and one other nearby industry. Department of Health records indicate that the stripper towers were operational in 1988.

A follow-up to the FDEP Wellfield report, issued in January 1987, focused on contamination directly attributable to and within the immediate area of the Solitron Devices facility. In September and October 1986, ten ground water monitoring wells were installed by FDEP on and near the Solitron facility. In addition, Solitron installed four ground water monitoring wells on its property. The hydrogeological and analytical data collected from the borings and monitoring wells demonstrated that the Solitron Site was one of the sources of ground water contamination found in nearby public wells. The most significant contamination was detected in the intermediate monitoring wells (approximately 100 feet below land surface (bls)). Contaminants detected included tetrachloromethane, trichloroethene, trans-1,2-dichloroethene, vinyl chloride, chlorobenzene, ethyl benzene, toluene, xylene, 1,1-dichloroethene, and 1,1-dichloroethane.

In a Contamination Assessment Report (CAR) submitted in September 1991, on behalf of Solitron Devices, seven potential soil contamination sources were identified on-site. These potential source areas include the following: a waste solvent pit; spent acid disposal tank; pH neutralization tanks and "Duriron®" collection system; leaking plating room floor drainage system; storm water collection/discharge; "Duriron®" collection system exit line; and a cast iron "T" exiting the north building. The CAR assessment included the installation of several monitoring wells to replace previously damaged wells. As a follow-up to the CAR, a Supplemental CAR, assessing soil contamination, was submitted to FDEP by Solitron Devices in June 1994.

In May 1994, REP Associates, Inc. (REP), on behalf of Solitron Devices, conducted a soil investigation and reported its results in a Supplemental Contamination Assessment Report. The scope of this investigation was to determine the nature and extent of soil contamination at the Solitron Devices Site as a condition of a Consent Order issued by FDEP. The investigation was

limited to delineation of chromium in soil located northeast of the north building. A total of seven soil samples were collected along with one ground water sample from a temporary well. Chromium was not detected above detection limits [1.0 milligram per kilogram (mg/kg) in the soil or ground water 0.005 milligram per liter (mg/L)] in the samples collected.

In January 1994, FDEP prepared a Site Inspection Prioritization (SIP) Report for the Solitron Devices Site. This report evaluated the potential for exposure to and migration of Site-related contaminants to human and environmental receptors and presented a preliminary Hazard Ranking System (HRS) score. Based upon the results of this HRS evaluation, FDEP concluded that additional work should be performed on the Site under CERCLA due to potential exposure concerns regarding local populations and the environment.

In June, 1995, REP, submitted a ground water model of the Surficial Aquifer System at the Solitron Devices property. Ground water flow was simulated using MODFLOW and MODPATH. The model characterized the travel time of contamination, and the effective capture zone of City of Riviera Beach municipal wells 4 and 5. The model simulated "backward tracking" of contaminant flow-lines to the Solitron property from municipal wells 4 and 5. The simulation indicated that after release, it would take just over five years for contaminants to reach the Riviera Beach wells 4 and 5 from Solitron Property, with increased contaminant capture after 10-years.

On October 13, 1998, an Expanded Site Inspection/ Remedial Investigation (ESI/RI) Phase I Report of the Solitron Devices, Inc. property was prepared US EPA Region 4. The field work was conducted in July and August of 1997, and involved the collection of 13 surface soil samples, 13 subsurface soil samples, 19 ground water samples and seven sediment samples. All samples collected were analyzed for extractable and purgeable organic compounds, pesticides, PCBs, cyanide, and metals. The results of the field investigation indicate elevated concentrations of several constituents which may be attributable to past Site activities. Elevated concentrations of volatile organics, semi-volatile organics, and inorganics were detected in ground water samples. Additionally, elevated concentrations of semi-volatile organics, pesticides, and inorganics were also detected in the surface and subsurface soil samples. Elevated concentrations of pesticides and inorganics were noted in sediment samples. The report concluded further action under CERCLA was needed to address concerns over the release of contaminants to ground water in the surficial aquifer.

A draft public health assessment, dated August 14, 2000, was prepared by the Florida Department of Health (DOH) for the Agency for Toxic Substances and Disease Registry (ATSDR). This reports states that no analytical data is available for "Finished Water" before 1981 and the likelihood of illness from exposure to contaminants in municipal water before 1981 cannot be determined.

Since 1981, only one known exceedance of a health-based drinking water standard occurred in July 1982. Approximately 4 ug/L of vinyl chloride were detected in the "Finished Water", which is slightly above the standard of 1 ug/L for long-term (lifelong) ingestion of vinyl chloride in

drinking water. The next sample collected in January 1983, contained less than 1 ug/L of vinyl chloride. Therefore, DOH concludes that community members could have been drinking water with vinyl chloride present at slightly above lifetime calculated "minimum risk" levels for roughly seven months. DOH further concludes that because people's estimated daily dose for that year was 157 times lower than the level found to affect animals in previous studies, no illness is expected from the estimated exposure. In addition, inhalation exposure was not likely to add significantly to the risk of illness.

On July 24, 2000, EPA released the results of a Remedial Investigation/Feasibility Study and the Baseline Risk Assessment for the Solitron Devices Site. In addition, a Proposed Plan for the Solitron Devices Site was released to the public and a thirty-day comment period was initiated. On August 14, 2000, EPA presented its preferred remedy for the Solitron Devices Site during a public meeting at the Riviera Beach City Council Chambers, Riviera Beach, Florida. At this meeting, representatives of EPA answered questions about sampling at the Site and the remedial alternatives under consideration. A transcript of the meeting was prepared and is available at the Information Repositories.

At the community's request, EPA offered another opportunity to discuss the Site and provide public comment. On September 19, 2000, an availability session was held in a conference room at the Hilton Hotel, two miles east of Riviera Beach City Hall. A public comment period was held from July 24, 2000 through August 22, 2000. An extension to the public comment period was requested. As a result, the comment period was extended to September 21, 2000.

Due to the concerns expressed by the City of Riviera Beach during the comment period, EPA agreed to conduct additional ground water investigations north of the Site prior to selecting a final remedy. The results of all the investigations are described in this Record of Decision (ROD) and are the basis for the selected remedy.

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

All basic requirements for public participation under CERCLA §§ 113(k)(2)(B)(i-v) and 117 were met in the remedy selection process. A Fact Sheet on the Site was first distributed in March 1997. Since that time, a community relations plan was further developed and implemented at the Site. An information repository was established in March 1997, at the City of Riviera Beach Public Library, at 600 Blue Heron Boulevard, Riviera Beach, Florida.

The original Remedial Investigation/Feasibility Study Reports, the Baseline Risk Assessment Report, and Proposed Plan for the Solitron Devices Site were released to the public on or before July 24, 2000. A Supplemental Feasibility Study based on additional field sampling and Revised Proposed Plan for the Solitron Devices Site were released to the public on April 16, 2004. These documents are incorporated in the Administrative Record for the Site. A copy of the Administrative Record, upon which the remedy is based, is located at the Information Repository. In addition, the Administrative Record and the Site (project) files are available for

review at the EPA Region 4 offices in Atlanta, Georgia. Notice of availability of these documents was published in the Palm Beach Post on April 16, 2004.

On April 29, 2004, EPA presented its preferred remedy for the Solitron Devices Site during a public meeting at Newcomb Hall, Riviera Beach Marina, 180 E. 13th Street, Riviera Beach, Florida. At this meeting, representatives of EPA answered questions about sampling at the Site and the remedial alternatives under consideration. A transcript of the meeting was prepared and is available at the Information Repositories. A 30-day public comment period was held from April 16, 2004 through May 17, 2004. EPA's responses to comments which were received during the comment period are contained in Appendix A of this Record of Decision.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

The purpose of the remedial alternative selected in this ROD is to reduce current and future risks from this Site. Soil, sediment, and ground water contamination were investigated for cleanup through this remedy selection process. Ground water is the primary exposure pathway found at this Site. This is the only ROD contemplated for this Site.

5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 Conceptual Site Model

The conceptual site model for the Solitron Devices Site (Figure 5-1) incorporates information on the potential chemical sources, affected media, release mechanisms, routes of migration, and known or potential human receptors. The purpose of the conceptual site model is to provide a framework with which to identify potential exposure pathways occurring at the Solitron Devices Site. The model is then used to determine what samples are needed to evaluate the Site risks.

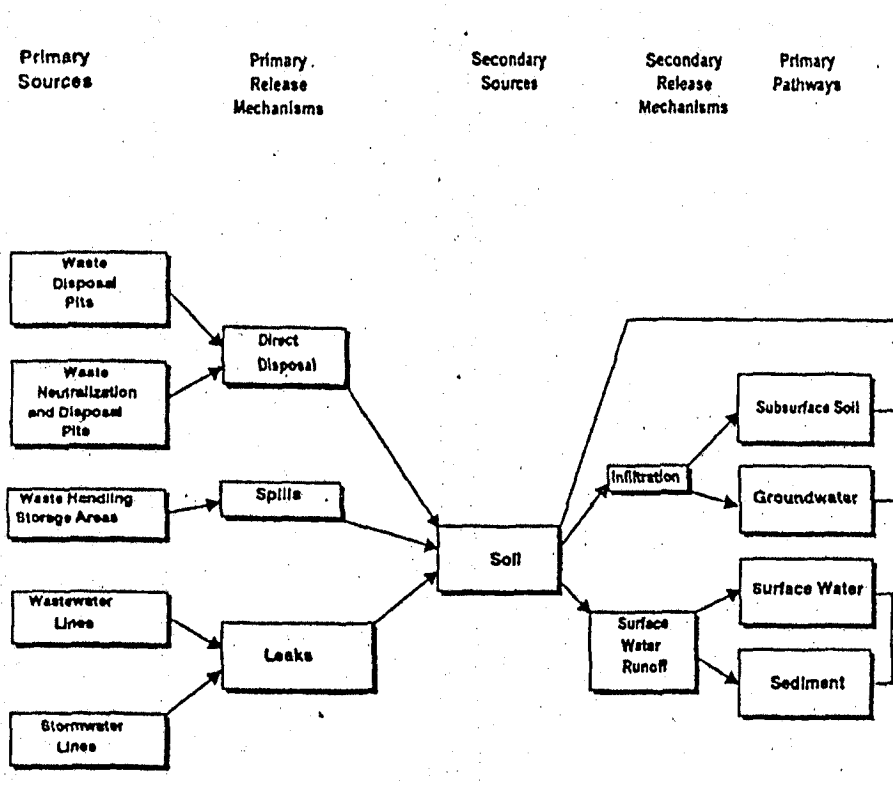
5.2 Physiography and Topography

The former Solitron Devices facility rests in a local depression at less than fifteen feet above mean sea level (amsl). The surrounding area is relatively flat except for a ridge which rises to over 35 feet amsl within 1/4 mile east of the facility. Drainage in the area is controlled by topography as well as a canal system.

5.3 Geology/Hydrogeology

The Solitron Devices Site lies at the northern extremity of the Atlantic Coastal Ridge subdivision of the Southern Geomorphologic Zone of Florida. The Coastal Ridge area parallels the coast and extends inland approximately two to three miles. The elevation on the ridge ranges from about 25 to 50 feet amsl. Soils on the Coastal Ridge are deep and excessively drained and typically consist of shelly sands.

FIGURE 5-1. CONCEPTUAL SITE MODEL



Potential Human Receptors

EXPOSURE ROUTE	CURRENT				FUTURE			
	Onsite Worker	Onsite Visitor	Nearby Resident	Recreational Person	Onsite Construction Worker	Onsite Worker	Onsite Resident	Recreational Person
Ingestion	X	X		X	X	X	X	X
Inhalation					X			
Dermal Contact	X	X		X	X	X	X	X
Ingestion					X			
Inhalation					X			
Dermal Contact					X			
Ingestion	•		•			X	X	
Inhalation	•		•			•	•	
Dermal Contact	•		•			X	X	
Ingestion								
Inhalation								
Dermal Contact								
Ingestion				X				X
Inhalation								
Dermal Contact				X				X

X Pathway was quantitatively evaluated

• Pathway was qualitatively evaluated

Geological formations underlying the region include, in descending order: the Pamlico Sand; the Anastasia formation; the Caloosahatchee Marl; the Hawthorn Group; and the Suwannee Limestone. These formations are further described below:

- Pamlico Sand - The Pamlico sand is of late Pleistocene age and consists of gray or white sand and will yield water to sand point wells. The unit reaches a thickness of approximately 10 feet in the vicinity of the Coastal Ridge area.

- Anastasia formation - The Anastasia formation is of Pleistocene age and consists of sand, sandstone, limestone, coquina, and shell beds. The unit reaches a thickness of approximately 200 feet in the vicinity of the Coastal Ridge area.

- Caloosahatchee Marl - The Caloosahatchee Marl is of Pliocene age and is composed mainly of shelly sand and sandy shell marl with minor amounts of limestone and sandstone. The thickness of the formation along the coast is not known.

- The Hawthorn Group (Formerly the Tamiami Formation, the Hawthorn Formation, and the Tampa Fomation) -The Hawthorn Group is of Miocene age, is present over 160 feet bls, and, in this area of Florida, is comprised of, in descending order, the Peace River formation and the Arcadia formation. The Peace River formation is comprised of interbedded quartz sands clays, and carbonates and is approximately 650 feet thick in the study area. The carbonate content within the Peace River Formation increases with depth forming a gradational contact with the subjacent Arcadia Formation. The Arcadia Formation rests beneath the Peace River Formation and is approximately 250 feet thick in the study area. The Arcadia Formation is generally comprised of hard, quartz sandy, phosphatic dolostone with some siliciclastic interbeds.

- The Suwannee Limestone - The Suwannee Limestone rests beneath the Hawthorn Group in the study area, and consists of crystalline and pelletal limestone. The Suwannee Limestone is of Oligocene age, and is the upper-most of a series of thick carbonate units that rest beneath the Miocene age formations and form the majority of the Floridan Aquifer system. Additional units comprising this thick sequence of carbonate deposits include, in descending order, the Ocala Limestone and the Avon Park Formation .

Detailed site-specific geologic information was obtained during the installation of monitoring wells in this investigation, previous investigations, and a USGS investigation on the Riviera Beach area. A veneer of surficial material classified as the St. Lucie-Urban Land-Paola association is present at the Solitron facility. These soils are nearly level to sloping, excessively drained sandy soils that are altered to an extent that former soils cannot be easily recognized. The area immediately surrounding the Site consists of Quartzipsamments series soils which are generally filled lowlands or built up areas which typically reach 80 inches or more in depth . It is likely that the surficial St. Lucie-Urban Land-Paola association soils beneath the facility have similar depths.

Hydrogeological investigations assessing ground water conditions in the Riviera Beach area have identified two aquifer systems in the area, the shallow aquifer and the Floridan aquifer. The upper-most of these is the shallow aquifer, which is the sole source for potable ground water in the area. A confining unit rests between the shallow aquifer and the Floridan Aquifer system. In the study area, ground water in the Floridan aquifer is brackish and is not utilized . Table 5-1 provides the general stratigraphy in the Riviera Beach area. Figure 5-2 shows a map view of Solitron, and Figure 5-3 is a geologic cross section of the area.

The shallow aquifer at Riviera Beach was investigated by the U.S. Geological Survey in 1977. In the investigation, the shallow aquifer was divided into four units categorized by lithology. During the 1998 field investigation, the boring for well, SL-MW-16D was installed at the Solitron facility and reached a total depth of 155' feet. The lithology encountered in boring SL-MW-16D is consistent with the lithology described by the US Geological Survey (USGS) in the 1977 investigation. Water levels recorded for monitoring wells screened within Unit 4 of the surficial aquifer have been observed to be consistently lower than levels recorded for monitoring wells screened within the overlying units and within the same well cluster. Unit four has been described as a leaky confined aquifer by local experts and is considered a component of the shallow ground water system.

Unit four rests upon a confining unit which separates the shallow aquifer system from the Floridan Aquifer System. These deposits are of Miocene age and comprise the Hawthorn Group. The upper portions of the Hawthorn Group (formerly known as the Tamiami formation) is primarily comprised of silty, shelly sands and silty shelly marls of low permeability with occasional thin interbedded limestone and sandstone. These deposits range between 70 and 100 thick in the study area. Relatively impermeable clayey and sandy marls comprise most of the lower portions of the Hawthorn Group. Some sources indicate the Hawthorn Group may be as much as 900 feet thick in the study area; however; most local investigations indicate the Hawthorn Group (Miocene age deposits) formations total approximately 500 to 600 feet of deposits in the study area.

The Floridan aquifer rests beneath the confining beds within the Hawthorn group, and is comprised of the lower portion of the Hawthorn Group, the Suwannee Limestone, Ocala Limestone, and Avon Park Formations. The formations forming the Floridan Aquifer primarily consist of carbonate rocks. The Floridan Aquifer is not a potable water source because water from the Floridan Aquifer in this area is brackish or saline. Therefore, the Floridan Aquifer is of limited concern to this investigation.

5.4 Surface Water Hydrology

Storm water overland runoff from the Site flows either directly into the north-south canal located adjacent, east, of the Site or into on-site storm water drainage grates which also empty into the canal. This canal flows 0.1 mile north to an east-west trending canal, which runs 0.4 mile westward along the north side of Blue Heron Boulevard, turns southwest at Lincoln Street (Avenue R), continues approximately 0.65 mile southward to 10th Street, and flows 0.75 mile westward to C-17 Canal. The C-17 Canal runs 3.3 miles northward to salinity control structure

Table 5-1
Summary of Geologic Units for the Area around Solitron Devices, Inc. Riviera Beach, Palm Beach, County Area

Location	Stratum (Deposits comprising the shallow aquifer are shaded)	Top of Stratum Depth (in feet)	(Bottom of Stratum) Cumulative Depth (in feet)
Solitron	St. Lucie-Urban Land-Paola association	0	> 6.5'
Solitron Well MW-6C & Nearby (one mile or less northeast and southwest of the Solitron property) USGS report wells	Unit 1 Unconsolidated sand with occasional organic material.	> 6.5	~50'
Solitron Well MW-6C & Nearby (one mile or less northeast and southwest of the Solitron property) USGS report wells	Unit 2 Unconsolidated sand and shells with scattered layers of sandstone.	~50'	~90'*
Solitron Well MW-6C & Nearby (one mile or less northeast and southwest of the Solitron property) USGS report wells	Unit 3 Very fine sand and shells	~90'*	~140'
Solitron Well MW-6C & Nearby (one mile or less northeast and southwest of the Solitron property) USGS report wells	Unit 4 Cemented calcareous sand and shell with occasional layers of marl. Most likely deposits from the Anastasia Formation and the Caloosahatchee marl	~140'	~236
Hawthorn Group	Interbedded quartz sands, clay, and carbonates.	~236'	~786'**
The Suwannee Limestone	Crystalline and pelletal limestone	~786'**	??

*Interpolated data using MW-6C on-site control (Adjacent to NE corner of Solitron Property) combined with nearby USGS information.
** Some reports suggest this value may be over 1,100' bls.
ft - feet ft² - square feet
cm - centimeters d day
s - second ~ - approximately
?? The cumulative depth to the Bottom of Miocene age sediments (Hawthorn Group) is uncertain due to local faulting and variations between available reference material for the Palm Beach County Area (See ** above). The thickness of the Oligocene age sediments (Suwanee Limestone) is uncertain, but are likely less than 100 feet

FIGURE 5-2. MAP VIEW OF SITE

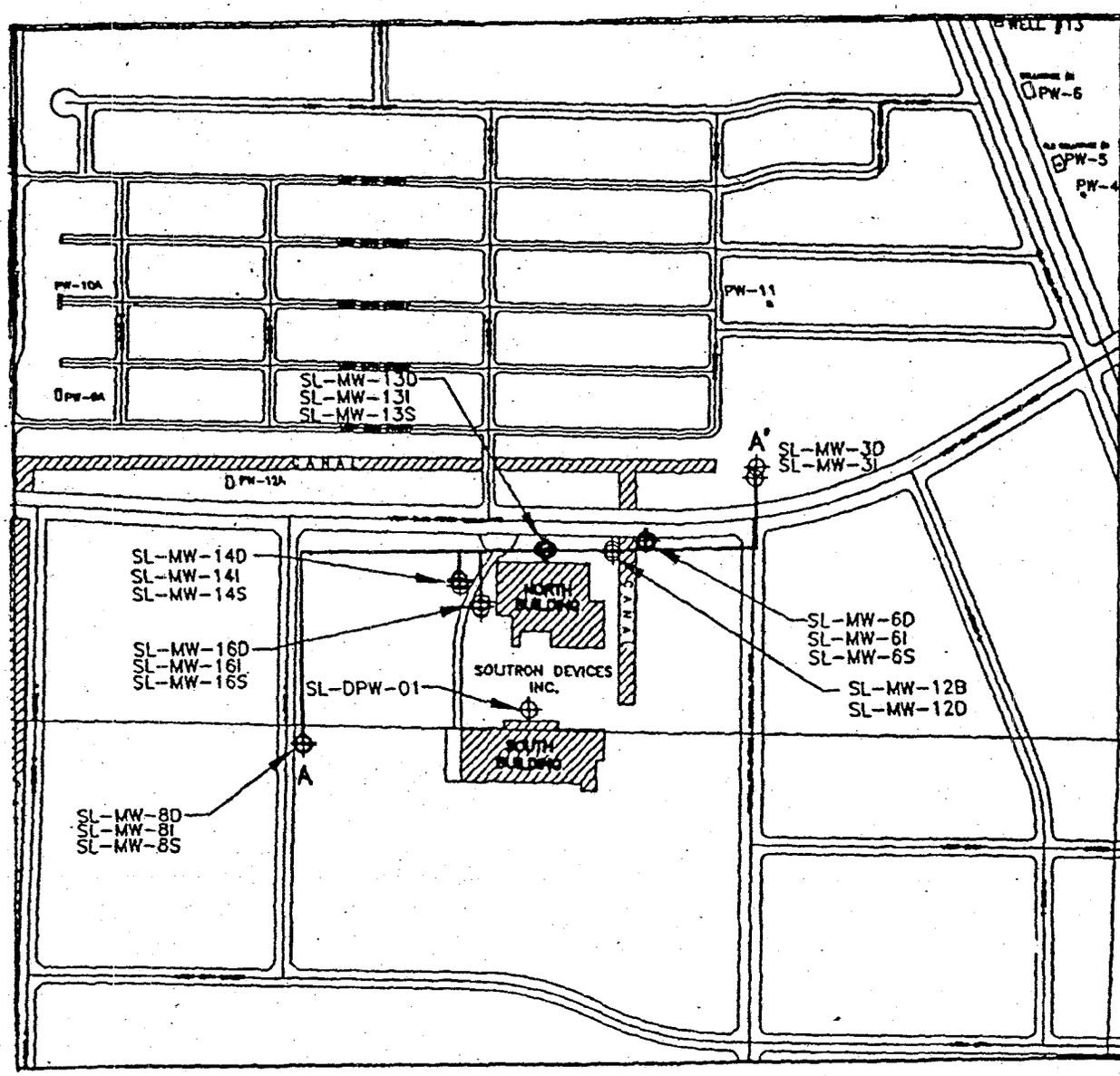
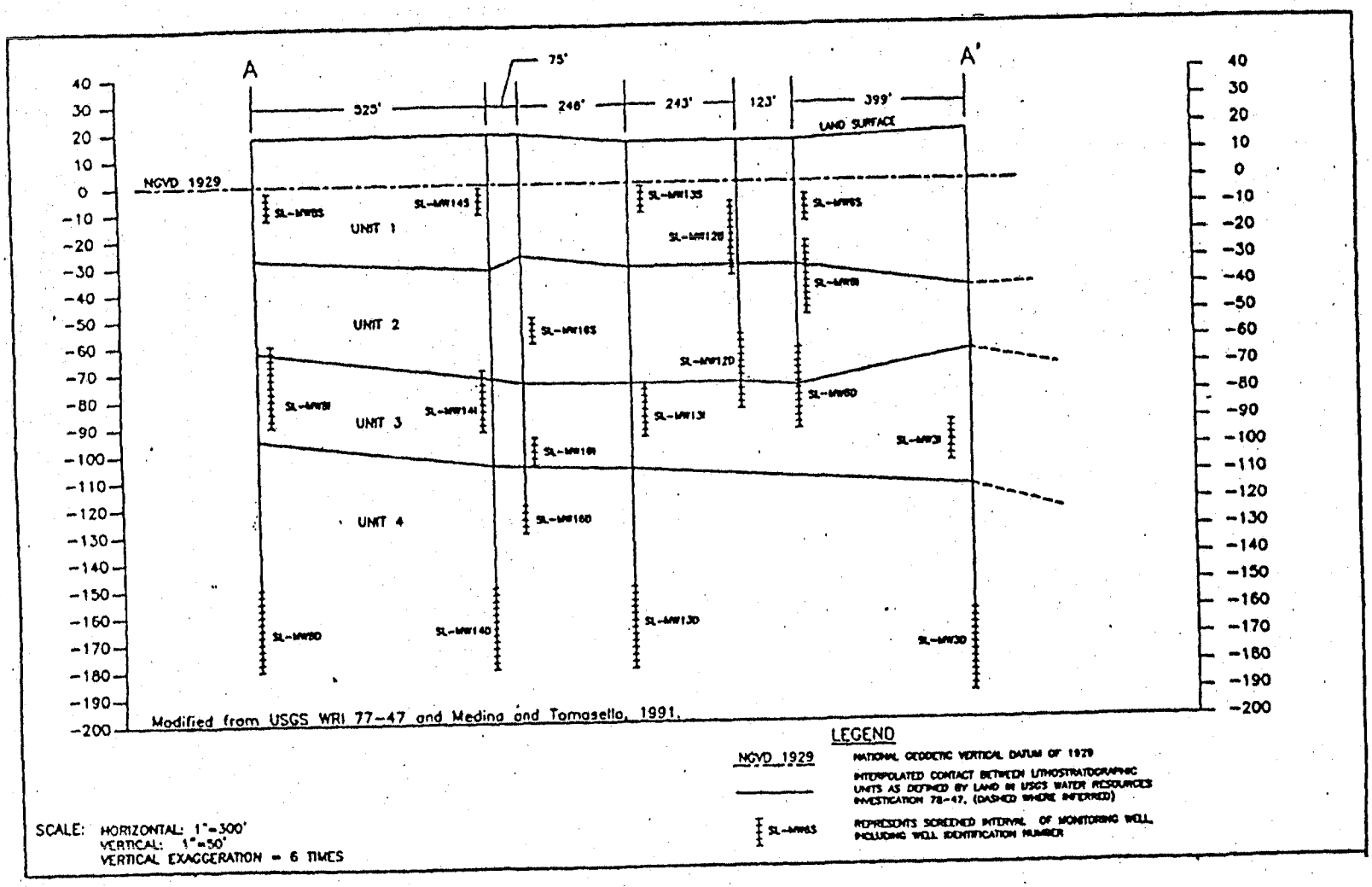


FIGURE 5-3. NORTH-SOUTH STRATIGRAPHIC CROSS SECTION



S-44, then 1.6 miles eastward to Lake Worth. Lake Worth is a relatively high salinity estuary with a point of discharge to the Atlantic Ocean located another 3 miles southeast of the C-17 outlet. The majority of the Solitron Devices property lies between the boundary of the 100-year flood and 500-year flood.

5.5 Wildlife/Natural Resources

The Solitron Devices Site is located in a highly urbanized/industrial area of Riviera Beach, Florida. Human activities on and surrounding the Site have altered all naturally occurring terrestrial habitats. The majority of the Site is covered with asphalt or buildings. Small open maintained grass-covered areas (less than 1 acre) are located around portions of the buildings and along Blue Heron Boulevard on the north side of the property. Several trees (oak species) are located immediately west of the North Building, as well as several landscaping shrubs along the corners of the building. Several large banyan trees are located in the north portion of the Site, as well as a row of palm trees which line Blue Heron Boulevard.

There are no aquatic habitats on the Solitron Devices Site proper. Immediately east of the Site is a drainage canal constructed by the South Florida Water Management District to handle and direct storm water runoff away from the area. This canal contains surface water during portions of the year with high precipitation. Surface water within the canal may also be an expression of the surfical ground water table at times during the year. Drainage from the canal flows to an east-west canal north of the property, to a primary canal (C-17), to a salinity control structure (S-44), and then to Lake Worth.

The drainage canals near the Site are steeply sloped (1:1) and the areas within and around the canal are sparsely vegetated with herbaceous, invading plant species. Surface water was observed in the canal north of the Site during the Phase I sampling investigation in August 1997. This water appeared to be less than one foot in depth and supported numerous unidentified small fish (top minnow species). The drainage canal was completely dry during the Phase II investigation in August 1998. The percentage of time during the year in which the canal contains water has not been documented.

5.6 Summary of Site Contaminants

5.6.1 Overview

Sample locations were selected based upon historical information, hydrogeological data for the region, and direct observation of potential source areas. During the ESI/RI, all samples collected were analyzed for extractable and purgeable organic compounds, pesticides, PCBs, cyanide, and TAL metals. Based on those results, soil samples collected during the FS were analyzed for purgeable organic compounds, TAL metals, and 1,4-dioxane. Ground water collected during the FS was analyzed for purgeable organic compounds and natural attenuation parameters. One well also was analyzed for 1,4-dioxane. In 2002, samples collected as part of the Supplemental Site Assessment were analyzed for purgeable organics, only.

Review of historical information identified a total of 11 potential source areas on the Solitron property with an additional 2 potential sources identified during the Phase I ESI sampling event. These potential source areas are presented on Figure 5-4.

1. A water discharge pipe located on the northern side of the southern building,
2. A partially buried tank located on the western side of the southern building,
3. A drum storage area located on the southeastern corner of the northern building during the investigation.
4. A waste solvent pit located at the southwest corner of the northern building;
5. A spent acid disposal tank located (west of the "Stained Soil Area identified during the ESI Phase I field effort) south of the northern building;
6. "Duriron®" collection system exit line located on the north side of the northern building;
7. Leaking plating room floor drainage system located inside (western portion) of the northern building;
8. Storm water collection/discharge (including "corroded" pipe elbow) exits from a sump in the northern building basement east to the north-south canal;

9&10. Two pH neutralization tanks and a "Duriron®" collection system located on the northeastern corner and western side of the northern building;

11. The cast iron "T" exiting the northwest corner of the northern building.

Two additional locations were considered potential sources for the ESI/RI Phase I investigation. There was a former loading dock located on the southeastern side of the southern building. Also, stained soil was identified during the Phase I ESI sampling. These stained soils were identified on the southern side of the northern building. Due to uncertain knowledge of housekeeping practices in this portion of the facility, it was treated as a potential source for sampling purposes. Potential source areas are presented on Figure 5-4.

In 2000 and 2001, the lift station and manholes north of the Site were identified as potential release locations (Figure 5-5). The Supplemental Site Assessment focused on the areas north of Blue Heron Blvd.

The ESI/RI and associated Baseline Risk Assessment employed the 1998 Region III RBCs as modified by Region 9 in 1999, and Florida Chapter 62-777 FAC. Industrial/ Commercial Exposure SCTLS as screening tools. Although EPA Region 4 is now using Region 9 Preliminary Remediation Goals (PRPS), these guidance concentrations (Direct Contact Industrial Exposure) do not change the evaluation with respect to arsenic and chromium. Although iron in soil no longer exceeds guidelines from the PRPS, iron was not considered of concern; consequently, the conclusions of the ESI/RI and subsequent potential action resulting from of those conclusions do not change. As such, the reference to and inclusion of RBCs has been left in this document for consistency with previous documents.

FIGURE 5-4. POTENTIAL ONSITE SOURCE AREAS

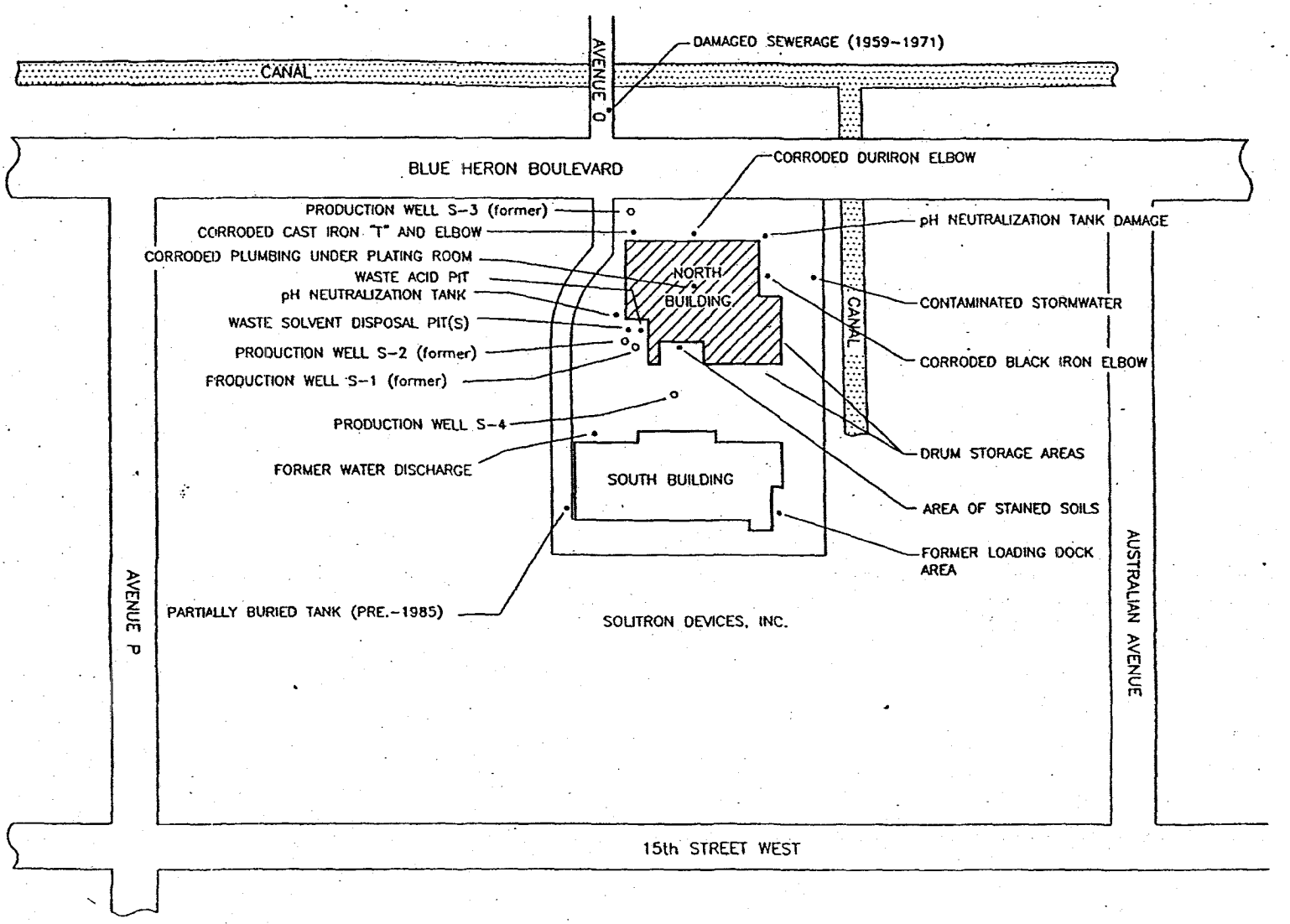
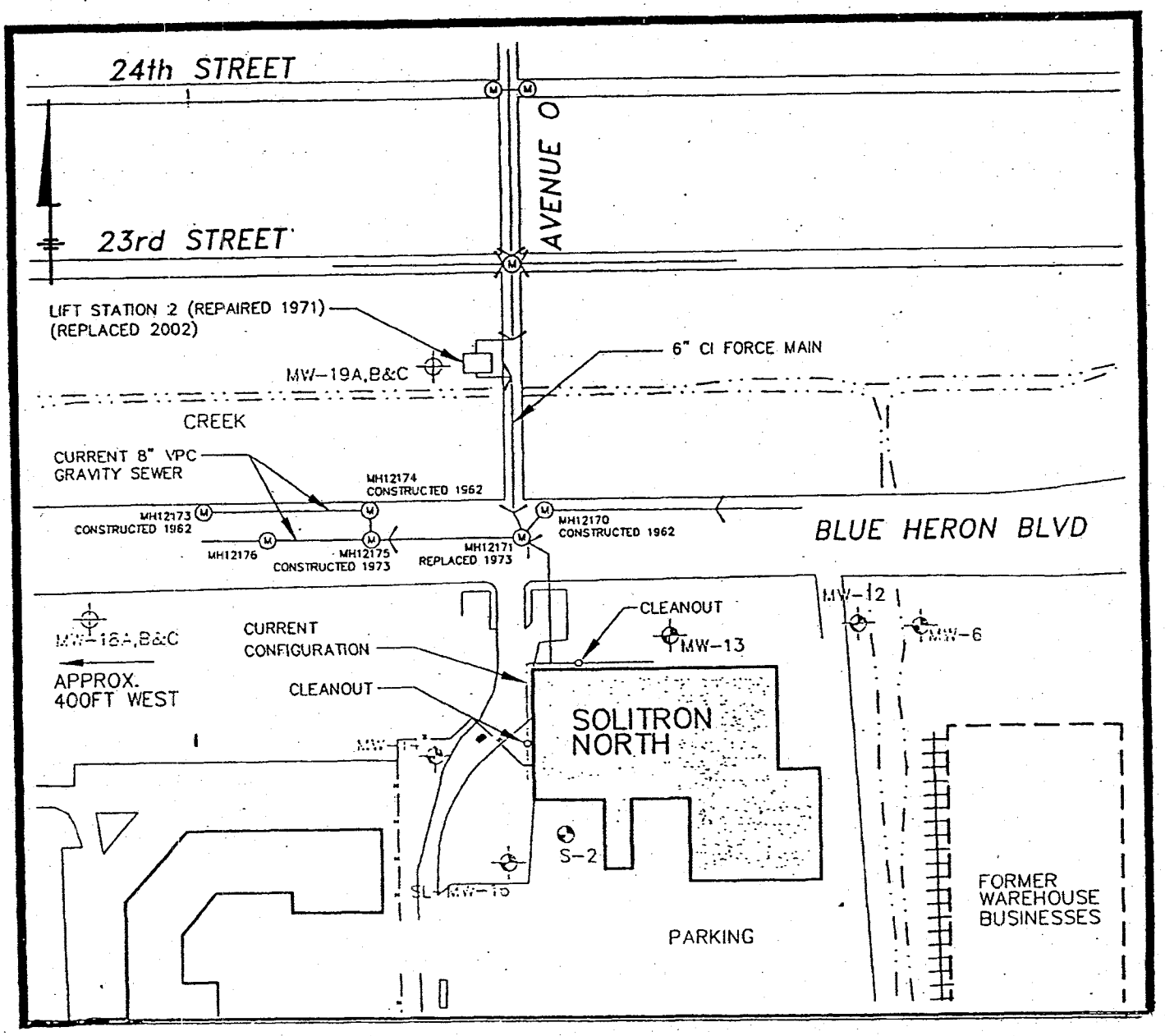


FIGURE 5-5. POTENTIAL OFFSITE DISCHARGE LOCATIONS



5.6.2 Substances Detected in Soil

Twelve surface and twelve subsurface soil samples were collected at the Solitron Devices Site during the field investigation. Sixteen samples were located around the north building and eight samples were located around the south building. In addition, two background samples were collected (one surface and one subsurface). The surface soil samples were collected from depths 0 to 3 inches bls; subsurface soil samples were collected from depths ranging from 3 to 8 feet bls, depending upon the depth to the water table. All soil (including source and background) sample locations are illustrated on Figures 5-6.

Inorganic analyses of surface soils in source areas indicate the elevated presence (above background) of all inorganic constituents typically used in electroplating operations. These analytes were wide spread across the Site. Analytes detected above EPA Region 3 Risk-Based Concentrations (RBCs) included iron, arsenic, and chromium. No other analytes detected in surface soils exceeded RBCs. Analyses of subsurface soil source samples indicated a significant reduction in inorganic contamination, relative to surface soil contamination; however, some of the analytes were identified as elevated. No analytes detected in subsurface soils exceeded RBCs.

Of the known organic constituents associated with the sources at the Solitron Devices Site used in past operations toluene and phenol were the only two detected in surface soil samples, and toluene (detected along the northern end of the northern building) was the only compound identified as elevated. Additionally, pesticide concentrations were elevated in seven of the twelve non-background surface soil samples collected and one sample contained PCBs, but these constituents are not associated with operations at Solitron Devices. There were no organic, pesticide, or PCB constituents detected above background concentrations in subsurface soil samples during this investigation.

During the Feasibility Study, twenty additional soil samples at ten different locations were collected under the North Building to determine if a contamination source was there. Figure 5-7 shows the location of the samples. Samples were collected at two depth intervals: at the surface (0-2 feet) and at the water table interface (approximately 10 feet below ground surface). These soil samples were analyzed for volatile organic compounds, RCRA metals and 1,4-dioxane. No analytes detected in soils beneath the building exceeded RBCs. In addition, analytes detected in soils beneath the buildings are not of concern in ground water.

5.6.3 Substances Detected in Ground Water

Two ground water sampling events were included as part of the ESI/RI field efforts. Sampling from Phase I occurred in July and August of 1997. Sampling from Phase II took place in July and August of 1998. Additional field activities in October, 1999, were conducted as part of the Feasibility Study (FS). Still more field activities were conducted in 2001 and 2002 as part of the Supplemental Site Assessment.

FIGURE 5-6. SURFACE AND SUBSURFACE SOIL SAMPLE LOCATIONS

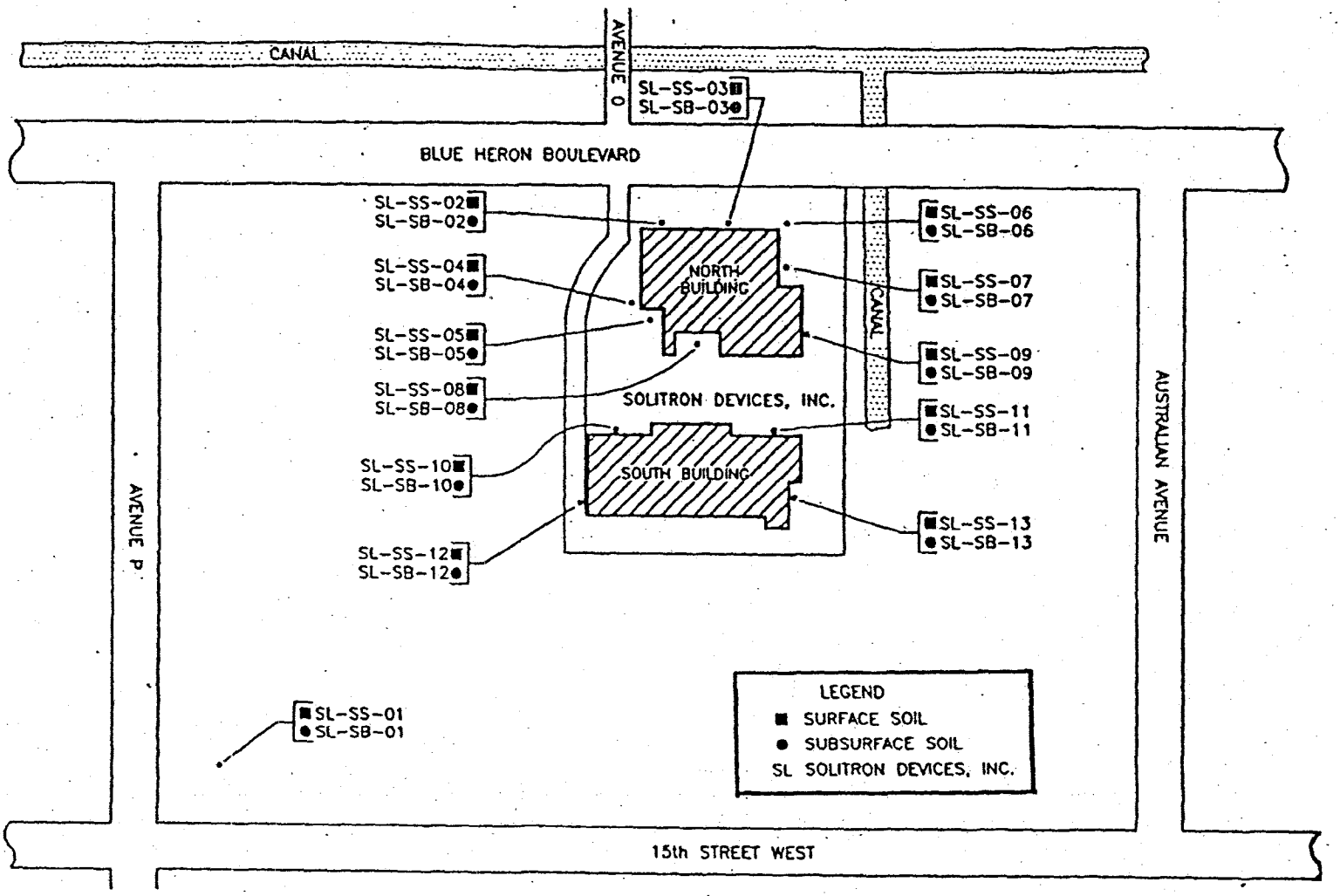
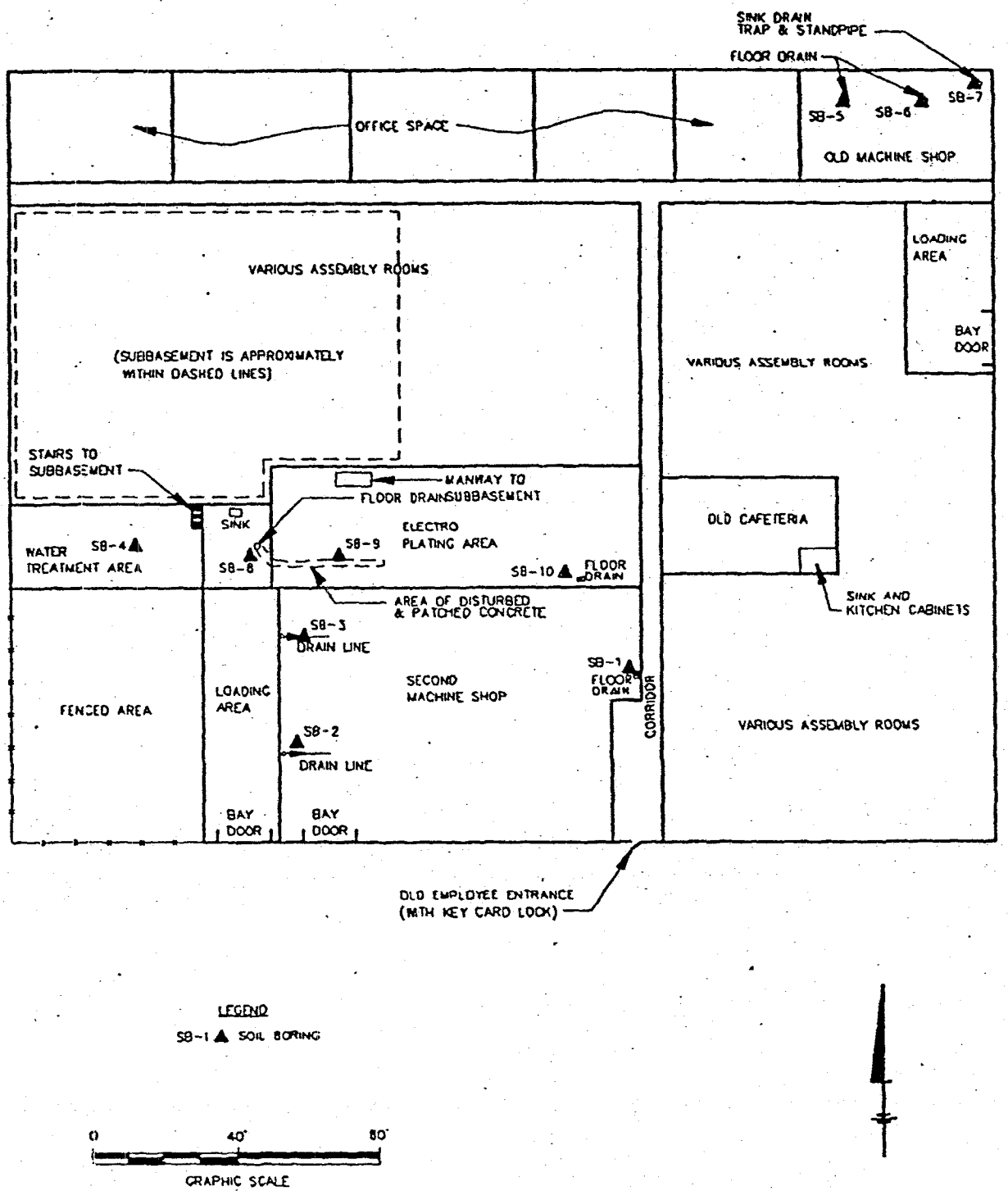


FIGURE 5-7. SURFACE AND SUBSURFACE SOIL SAMPLE LOCATIONS BENEATH THE NORTH BUILDING



All wells which have the majority of the screened interval resting at an elevation higher than 50 feet below land surface (bls) were grouped into the "shallow" well category, all wells which have the majority of the screened interval between 50 feet bsl and 100 feet bls were grouped into the "intermediate" category, and all wells which have screened intervals below 100 feet bls will fall into the "deep" well category.

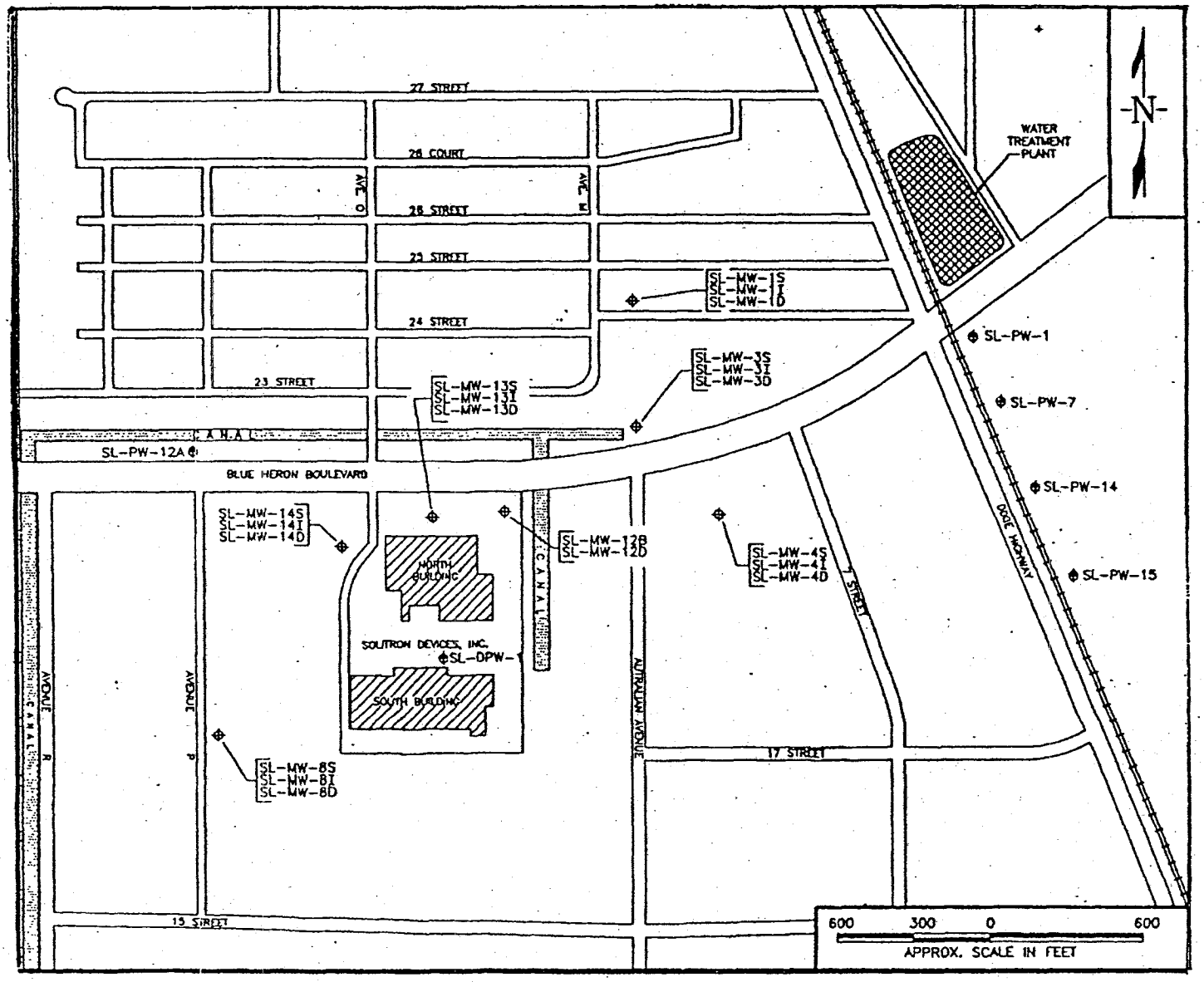
In 1997, ground water samples were collected from 14 existing permanent monitoring wells on or near the Site and five public drinking water supply wells. The existing monitoring wells were installed during previous environmental investigations associated with the Solitron Devices Site and the Riviera Beach wellfield contamination study. The public water supply wells are part of the active Riviera Beach wellfield. Monitoring well and public water supply well sample locations are shown on Figure 5-8.

Ground water analytical results are organized in accordance with well groupings. During the 1997 sampling, a total of five wells categorized as shallow were sampled. Analyses of samples collected from shallow wells indicate elevated concentrations of several inorganic analytes in each of the non-background ground water samples. Of all the inorganic analytes detected, only iron exceeded the EPA Region III RBC in each shallow well except the background shallow well SL-MW-08S. None of the inorganic analytes detected in shallow wells exceeded EPA drinking water maximum contaminant levels (MCLs). Organic analyses of samples collected from shallow wells detected elevated concentrations in only one sample. The sample from shallow well SL-MW-13S contained elevated concentrations of tetrachloroethene (8 µg/L), trichloroethane (44 µg/L), 1,2-dichloroethene (27 µg/L), and vinyl chloride (16 µg/L). The concentrations of each of these compounds exceeded the Region III RBCs and EPA MCLs.

During the 1997 sampling, a total of five intermediate wells were sampled. Analyses of samples collected from the intermediate wells detected elevated concentrations of inorganic analytes in each non-background well. Iron was identified as present in concentrations exceeding the EPA Region III RBC in two wells and in the background sample. Thallium was detected at a concentration exceeding the EPA Region III RBC and the EPA MCL. Organic analyses of samples collected from the intermediate wells detected the majority of elevated concentrations, primarily in one well, SL-MW-13I. Intermediate well SL-MW-13I contained the following elevated compounds: chlorobenzene at 680 µg/L; 1,2-dichloroethene (total) at 14 µg/L; ethyl benzene at 690 µg/L; toluene at 10 µg/L; vinyl chloride at 180 µg/L; total xylenes at 1,100 µg/L; 1,4-dichlorobenzene at 27 µg/L; and 2,4-dichlorophenol at 11 µg/L. Each of these elevated concentrations except toluene equaled or exceeded the EPA Region III RBC.

During the 1997 sampling event, a total of nine deep wells were sampled. Inorganic analyses of samples from the deep wells identified only three analytes elevated above background concentrations. Only iron in the background sample exceeded EPA Region III RBCs. None of the inorganic analytes detected in deep wells exceeded EPA MCLs. Organic analyses identified elevated compounds in two deep wells. Chlorobenzene at 120 µg/L, 1,2-dichloroethene (total) at 320 µg/L, vinyl chloride at 730 µg/L, and 1,2-dichlorobenzene at 24 µg/L exceeded the EPA Region III RBCs. Vinyl chloride and 1,2-dichloroethene exceeded the EPA MCLs.

FIGURE 5-8. 1997 GROUND WATER SAMPLE LOCATIONS



In 1998, ground water samples were collected from 22 permanent monitoring wells and one public well. Twelve of the monitoring wells were previously installed and 10 wells were installed during the 1998 field investigation. The public water supply well is part of the active Riviera Beach well field. Monitoring well and public water supply well sample locations are shown on Figure 5-9.

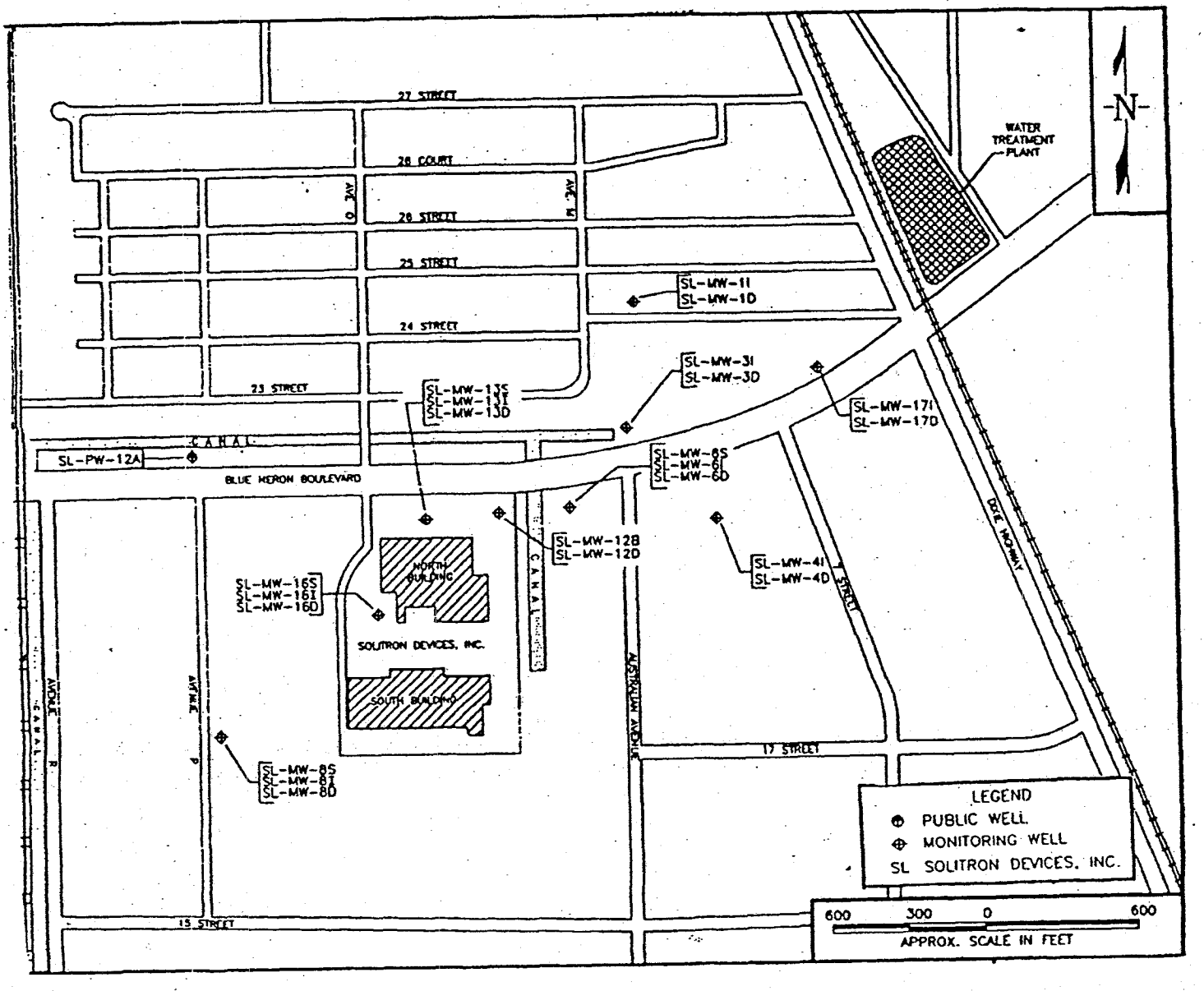
During the 1998 sampling, a total of four wells categorized as shallow were sampled. Analyses of samples collected from shallow wells indicate elevated concentrations of several inorganic analytes in each of the non-background samples. As in the 1997 results, only iron exceeded EPA Region III RBCs and this occurred in each of the non-background shallow wells sampled. None of the inorganic analytes detected in shallow wells exceeded EPA MCLs. Organic analyses of samples collected from shallow wells detected elevated concentrations in only one ground water sample. The concentrations of chlorobenzene at 14 µg/L, 1,2-dichloroethene at 25 µg/L, trichloroethane at 41 µg/L, and vinyl chloride at 27 µg/L exceeded the Region III RBCs. Also, concentrations of 1,2-dichloroethene, trichloroethane, and vinyl chloride exceeded EPA MCLs.

During the 1998 ground water sampling event, eleven intermediate wells were sampled. Analyses of samples collected from the intermediate wells detected elevated concentrations of inorganic analytes in each non-background well. Iron was identified as present in concentrations exceeding the EPA Region III Risk-Based concentrations in the background sample and in two monitoring wells. Barium exceeded the EPA Region III RBC. No other inorganic analytes detected in intermediate wells exceeded the EPA Region III RBC and none of the analytes detected exceeded the EPA MCLs. Organic analyses of samples collected from the intermediate wells detected elevated concentrations chlorobenzene at 340 µg/L, 1,2-dichloroethene (total) at 120 µg/L, bis(2-ethylhexyl)phthalate at 21 µg/L, and vinyl chloride at 9 µg/L. 1,2-dichloroethene and vinyl chloride exceeded EPA MCL.

During the 1998 sampling event, a total of nine deep wells were sampled including the public well (PW-12A). Inorganic analyses of samples from the deep wells identified elevated concentrations of inorganic analytes in each well except the public well. Cadmium at 2 µg/L and antimony at 10 µg/L were the only inorganic analytes detected that exceeded the EPA Region III RBCs, and antimony was the only inorganic analyte that exceeded an EPA MCL Organic analyses identified elevated compounds in four deep wells. Chlorobenzene at 98 µg/L and 1,4-dichlorobenzene at 4 µg/L were the only two compounds identified as exceeding the EPA Region III RBCs. None of the compounds identified in deep wells exceeded EPA MCLs.

In 1999, ground water samples were collected from 13 existing permanent monitoring wells. The samples were collected from three shallow wells, five intermediate wells, and five deep wells. Monitoring well sample locations are shown on Figure 5-9. The wells were selected for sampling to provide sufficient spacial coverage to allow completion of a cross-sectional distribution of contaminants in the impacted area, and to support evaluation of natural attenuation as a remedial alternative. All wells were sampled and analyzed for VOCs and natural attenuation parameters. Samples from well cluster MW-13 were also analyzed for 1,4-dioxane.

FIGURE 5-9. 1998 & 1999 GROUND WATER SAMPLE LOCATIONS



Organic analyses identified elevated compounds in one shallow and one deep well (well cluster MW-13). Benzene at 6 µg/L, trichloroethane at 31 µg/L, and vinyl chloride at 31 µg/L were compounds identified as exceeding the EPA Region III RBCs and EPA MCLs. 1,4-dioxane was not detected in well cluster MW-13.

VOCs were detected in concentrations above MCLs in six of ten ground water samples taken at the water table depth from boreholes beneath the building. The concentrations of these constituents were generally within one order of magnitude of those detected in samples from nearby shallow monitoring well MW-13A. The highest concentrations of any constituents detected in ground water during the September 1999 sampling were detected in samples collected from the former machine shop in the northeast quadrant of the building (trichloroethane: 200 ug/L, SB-6; cis 1,2- dichloroethene: 190 ug/L, SB-5).

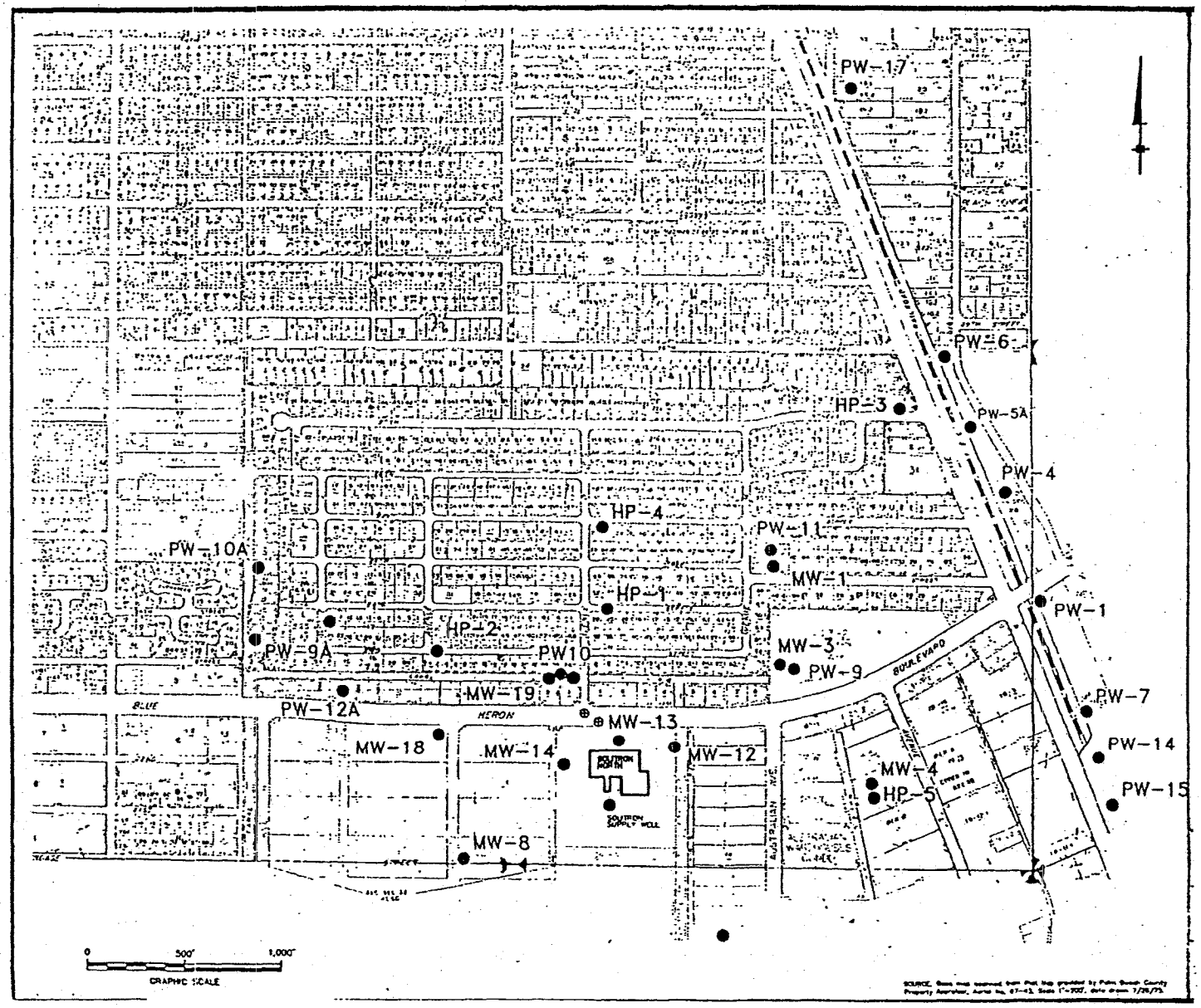
EPA agreed to sample the influent and effluent of the City's water treatment plant at the request of the City and its consultant, due to concerns expressed about unidentified compounds reported in EPA's 1997 and 1998 sampling events. In May 2000, EPA sampled the influent and effluent as well as public wells PW-9A, PW-10A, and PW-16, and three salinity control wells. The wells did not contain VOC contamination and unidentified compounds were not found in the influent to the water treatment plant. Since the City periodically reports contamination in PW-4, PW-5, PW-6, PW-12A and PW-17 as part of its permit to operate the drinking water plant, EPA also considered the data reported by the water treatment plant on the drinking water program online reporting system during May 2000.

In June of 2000, EPA concluded that sampling showed that ground water quality within the shallow aquifer in the vicinity of the Solitron facility had been impacted by past activities at the Solitron Site. However, because EPA's conclusions did not demonstrate current impacts to the well field, the City of Riviera Beach objected to EPA's assessment and asked that additional ground water assessment be conducted north of the Site.

After several years of negotiating the extent of additional work needed, sampling procedures, and access issues, the Supplemental Site Assessment sampling started in January 2002 and was complete in December 2002. Ten new monitoring wells were installed in two, three well clusters, and one, four well cluster. Five hydro punch borings were also installed to supplement the well data with screening values. See Figure 5-10. Each hydro punch borehole was advanced to the confining unit, and ground water samples were collected for laboratory analysis of VOCs ahead of the outer core barrel at twenty-foot intervals, beginning at the water table.

During the 2002 sampling, three wells categorized as shallow were sampled. Organic analyses of samples collected using a low flow protocol from shallow wells detected elevated concentrations in only one ground water sample (MW-13A). The concentrations of tetrachloroethene at 14 µg/L, cis-1,2-dichloroethene at 470 µg/L, trichloroethane at 70 µg/L, and vinyl chloride at 62 µg/L exceeded the Region III RBCs and EPA MCLs.

FIGURE 5-10. 2002 GROUND WATER SAMPLE LOCATIONS



During the 2002 sampling, nine wells categorized as intermediate were sampled. Organic analyses of samples collected using a low flow protocol from intermediate wells detected elevated concentrations in five ground water samples (MW-1C, MW-3B, MW-13B, MW-19A, and MW-19B). Concentrations of chlorobenzene, cis-1,2-dichloroethene, and vinyl chloride exceeded the EPA or Florida MCLs in samples from four wells: MW-1C (vinyl chloride at 1.5 μg/L), MW-13B (chlorobenzene at 140 μg/L, vinyl chloride at 4.3 μg/L), MW-19A (chlorobenzene at 500 μg/L, cis-1,2-dichloroethene at 320 μg/L, and vinyl chloride at 640 μg/L) and MW-19B (vinyl chloride at 1800 μg/L).

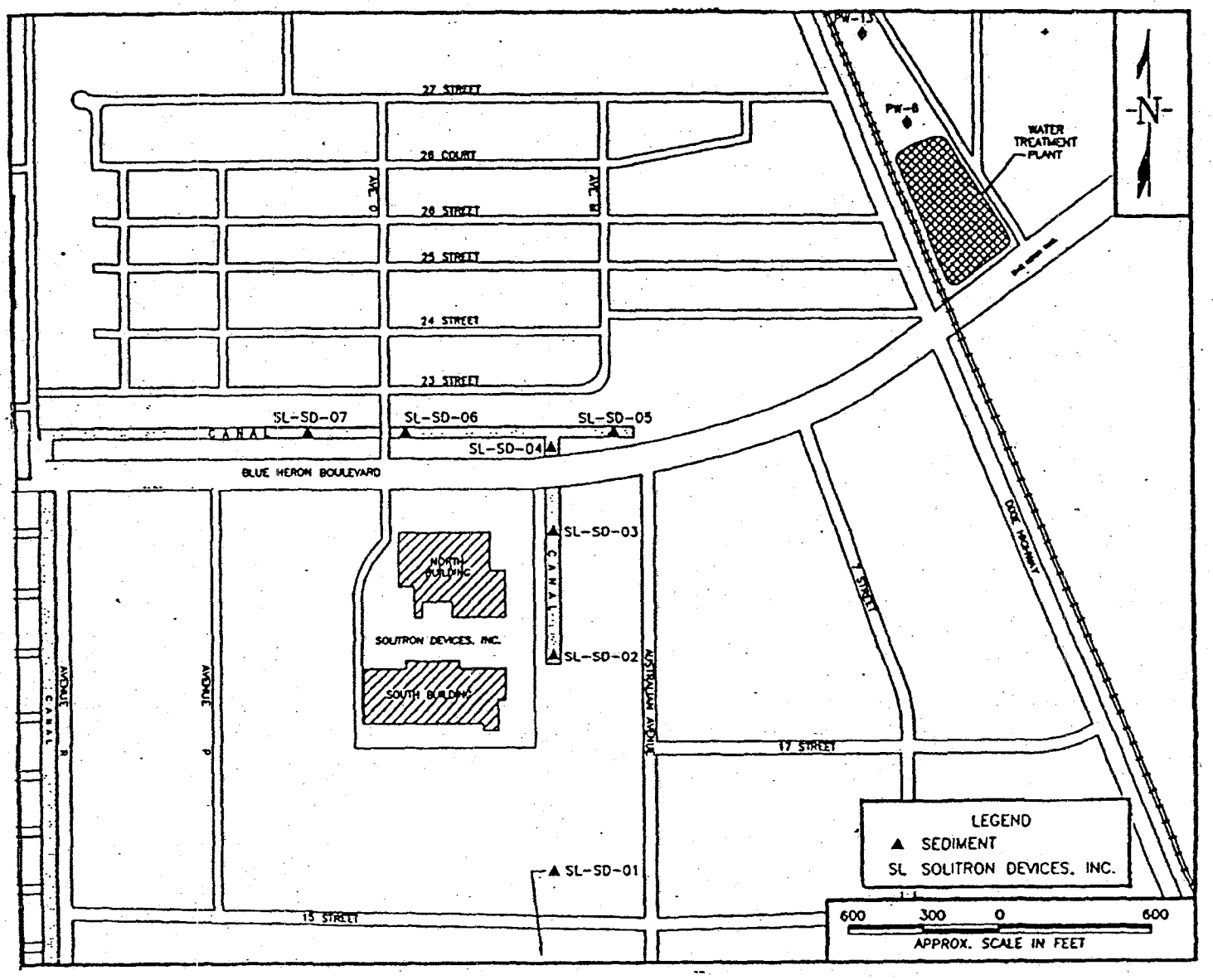
During the 2002 sampling, ten wells categorized as deep were sampled. Organic analyses of samples collected using a low flow protocol from deep wells detected elevated concentrations in five ground water samples (MW-1D, MW-1E, MW-3C, MW-13C, and MW-19C). Concentrations of vinyl chloride at MW-3C (10 μg/L), MW-13C (21 μg/L) and MW-19C (2100 μg/L), chlorobenzene at MW-1D (140 μg/L) and MW-13 (160 μg/L), and benzene at MW-13C (32 μg/L) exceeded EPA or Florida MCLs.

In addition to monitoring wells, ground water screening results from monitoring well boreholes and hydro punch locations installed in 2002, indicated detectable levels of contaminants above the MCLs. Specifically, cis-1,2-dichloroethene was detected above these criteria in screening samples from the MW-19 location from 45 feet through 105 feet bls and at 145 feet bls (highest concentration 2000 ug/l at 65 feet bls), and the HP-1 location from 76 through 136 feet bls (highest concentration 2000 ug/l at 136 feet bls). Vinyl chloride was detected above these criteria in the MW-1 location from 225 through 245 feet bls (highest concentration 39 ug/l at 225 feet bls), the MW-18 location from 135 through 155 feet bls (1.3 ug/l), the MW-19 location from 45 through 205 feet bls (highest concentration 2500 ug/l at 65 feet bls with a detection of 2300 ug/l at 145 feet bls), the HP-1 location from 76 through 256 feet bls (highest concentration 7,200 ug/l at 136 feet bls), and the HP-3 location from 215 through 235 feet bls (highest concentration 4.9 ug/l at 215 feet bls). 1,1-Dichloroethene was detected above criteria in the 135 and 155 feet bls depth intervals from the MW-18 location (highest concentration 27 ug/l at 155 feet bls). Chlorobenzene was detected above criteria in the 96 feet bls depth interval at the HP-5 (MW-4) location (150 ug/l).

5.6.4 Substances Detected in Sediment

All sediment samples evaluated in this report were collected as part of the 1997 field investigation. In order to characterize off-site migration of Site related contaminants, six sediment samples were collected from down gradient locations. Also, a control sediment sample was collected from an up gradient location in a canal located immediately south of the intersection of 13th Street and Avenue P, approximately 2,300 feet south of the Site. Three sediment samples were collected from the north-south canal located immediately east of the Site. Three sediment samples were collected from the east-west canal located north of Blue Heron Boulevard. A duplicate sediment sample was collected from one sample location. Sediment sample locations are shown on Figure 5-11.

FIGURE 5-11. SEDIMENT SAMPLE LOCATIONS



Several inorganic constituents were detected at elevated concentrations in sediment samples including the following: antimony, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, sodium, and zinc. The highest concentrations of these analytes and compounds in sediment samples were detected in the north-south drainage canal located immediately east of the Site. All of the constituents detected show trends of decreasing concentrations with distance downstream from the Site. The elevated inorganic constituents may be attributable to past activities at the Solitron Devices Site.

Several extractable organic constituents were detected at elevated levels in sediment samples collected from surface water bodies located at the Solitron Devices Site. The extractable organic constituents include: benzo(a)anthracene, benzo(a)pyrene, benzo(b and/or k)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Several pesticides were detected at elevated concentration in the canal. There are no available records that indicate these compounds were used in past activities at the Solitron Site, and therefore, may be attributed to several businesses in the area.

5.6.5 Substances Detected in Surface Water

Surface water samples were not collected during the investigation because the canal adjacent to the facility is intermittent and during the RI was dry due to the lack of rainfall of adequate duration and magnitude.

5.7 Contaminant Fate and Transport

Conceptually, as contaminants are released to ground water from a source, the dissolved material will disperse along the general ground water flow path away from the source area. Concentrations will decline with dispersion and source material may be altered with distance from the source through numerous attenuation processes (sorption, diffusion, volatilization, biodegradation, etc.), establishing a concentration gradient highest at the source and lowest at the plume fringe.

A contaminant plume will expand until equilibrium is reached, i.e., where the rate of attenuation at the fringe is equal to the rate of release from the source. Under expanding conditions, overall contaminant concentrations at fixed sampling points along the ground water flow path would logically be expected to increase until the plume reaches equilibrium. As source material is depleted over time, the attenuation rate will exceed the release rate, and the plume will begin to shrink. Under these conditions, contaminant concentrations at fixed sampling points would be expected to decline with time.

Prior to completion of the 2002 supplemental site investigation activities, the initial transport mechanism at the Site was thought to have been the result of spills, leaks, etc., from the process areas on the former Solitron property. Data collected from monitoring wells associated with the Solitron Site during the 1999 sampling demonstrated this decreasing contaminant concentration trend. In many cases, concentrations in these wells over time were nearly an order of magnitude

lower, particularly for the most elevated constituents. Data collected from these wells in 2002 did not show increases.

Shallow ground water samples collected from temporary boreholes beneath the north former Solitron building contained detectable analytes similar to those detected in MW-13A (the shallow well at closest proximity to the building) at similar concentrations. On the basis of observed similarities and the spatial proximity to the MW-13 cluster, it is possible that ground water at deeper intervals beneath the building might show similar comparability to deeper well samples in the MW-13 cluster

During the period of operation, the former Solitron facility utilized at least three on-site production wells to provide water for air-conditioning chillers, as well as other uses (See Figure 5-4). Although data relative to the operational history of these wells are limited, water usage reportedly was quite substantial and operation of these wells may have provided a hydraulic control to migration and ultimately capture and remove any material released on-site. Such releases included a reported piping failure in the vicinity of the MW-13 cluster, one suspected area of on-site release where characterization efforts detected residuals from that suspected release.

During the 2002 supplemental site investigation activities, a previously unidentified area north of the facility was found to contain VOCs in ground water, in particular vinyl chloride, at concentrations orders of magnitude above those detected in ground water beneath the former Solitron facility. The highest concentrations were detected adjacent to and north of a domestic sewerage lift station (Lift Station #2) at the intersection of Avenue O and 23rd Street. Specifically, high concentrations of cis-1,2-dichloroethene and vinyl chloride were detected commencing at a sample depth of 45 feet bls during the installation of MW-19.

The former Solitron facility reportedly discharged to the City's sanitary sewer system from the date operations commenced in 1960. Damage to Lift Station #2 from the apparent acid wastewater from the Solitron facility was observed and repaired by the City as early as 1967. It is not known how many times the lift station was repaired; however, Lift Station #2 was excavated and replaced by the City as recently as 2002. Historical corrosion and leakage from the lift station, receiving manhole and surrounding sewer lines appears to have been a primary pathway for the release of material to the subsurface.

Chlorobenzene has also been detected in ground water above criteria; however, the areal distribution of chlorobenzene shows a decidedly different pattern than other VOCs. The data indicate that a second "lobe" of the chlorobenzene plume exists in the 50 – 150 feet depth range, centered around the HP-5 location east of the Solitron facility and southeast from the lift station, at the City's public works compound.

Migration of ground water contaminants in the vicinity of the Solitron Site has also been influenced by the presence of public supply wells. Impacts to ground water quality were first noted in public supply well PW-9, approximately 600 feet northeast of the Solitron Site, during

maintenance activities to replace a pump in 1970. PW-9 was operational from 1961 until it was taken out of service in 1974. As reported by FDER in 1985, the pump in PW-9 failed in late 1970, and, during replacement, corrosion was found in the motor and standpipe, and a "pesticide" odor was noted.

The pump was replaced, and the well was placed back in service. The well ultimately was replaced with PW-9A, located west of the defined contaminant plume, as shown on Figure 4. PW-10, immediately adjacent to lift station #2, was operational from 1961 until it was also taken out of service in 1974 and replaced with PW-10A to the north of PW-9A. Like PW-9, PW-10 was not abandoned until 1980. The year that PW-11 (in the vicinity of the MW-1 cluster; 1,000 feet northeast of Lift Station #2), became operational is not known. PW-11 was abandoned in 1973 due to mechanical problems, and was replaced by PW-11A in approximately the same location. This well operated until 1982, when it was taken out of primary service; however, the City continued to utilize the well in periods of excess water demand until 1990.

The source of the vinyl chloride is likely the result of the oxidation of chlorinated ethene (PCE and/or TCE). Reductive processes will transform the material through DCE to vinyl chloride, and, under normal ground water flow conditions, the plume will disperse with the flow gradient (similar reductive dechlorination of dichlorobenzene, and dispersion of chlorobenzene would also be expected). As dispersion occurs, the more mobile vinyl chloride moves away from the release point at a relatively higher rate of travel than the parent material, and a chemical species gradient will form with vinyl chloride at the outer portion of the plume where dilution, oxidative processes that can aid in the mineralization of the vinyl chloride, and other processes ultimately decrease the concentration of vinyl chloride to below detectable limits.

The vinyl chloride-predominated plume centered around Lift Station #2, however, appears to have a minimal dispersive gradient. One possible explanation for this could be the result of the relocation of PW-9A, and PW-10A (and installation of an additional well, PW-12A) from the eastern side to the western side of the contaminant plume, coupled with the continued operation of the remaining public supply wells to the east These conditions may have created a hydraulic "dead zone" retarding ground water flow that has prevented extensive lateral dispersion of the released material. This reduced movement will allow the reductive process to convert this material to the reductive end point (vinyl chloride) without the dispersive flow resulting in a localized accumulation of the vinyl chloride.

Although operation of PW-10 ceased in 1974, it was not abandoned until 1980. The condition of this well at the time of abandonment is not known at this time; however, under Site conditions including a downward vertical gradient, this well is likely to have provided a conduit to vertical migration following releases in the vicinity of the lift station. This condition could help explain the vertical distribution pattern in this area.

Another factor that has likely influenced contaminant distribution is the zone of tight silty sand located above the approximately 140 feet depth in the source area (MW-19/HP-1). This depth coincides with the zone of highest impact. Because this zone is likely less permeable than the

sand above and below this zone, one possible scenario is that released material migrated downward into this zone, at which point migration slowed. The migrating material may have moved through this less permeable zone into the more permeable zones below and continued this vertical movement through the more permeable materials beneath until reaching the again less permeable sandy clay and clay at the approximately 250 feet depth, where it would accumulate. More sorption occurs with finer aquifer material present, and dilution rates in less permeable zones would be expected to be lower than those in more permeable material. The result of this migration scenario would be higher residual concentrations in less permeable zones with decreasing residuals in zones where higher dilution rates would occur. This pattern of distribution relative to lithology is evident.

An additional potential result of released material encountering a less permeable zone could be a horizontal migration of the material along the surface of that zone that would follow the topography of that surface. The result of this condition would be a more areal extensive impact at this depth zone. The vertical and horizontal distribution of VOCs around the lift station relative to the silty sand encountered at approximately 140 feet depth show this expected pattern.

The public supply wells are generally screened in the more permeable zone above the sandy clay encountered at a depth of approximately 225 feet bls. This condition would be expected to draw material through this zone, resulting in a larger areal impact biased to the direction of the pumping wells. This condition is also evident in the distribution of the vinyl chloride plume; however, concentrations of vinyl chloride detected in the effected wells have shown a general decline with time. Recent EPA sampling and analysis of the raw water influent to the City of Riviera Beach water treatment plant air stripping system did not detect concentrations of VOCs above drinking water criteria. The testing was conducted over a five-day period, from July 15, 2002, to July 19, 2002. This may indicate that the plume is declining.

5.8 Natural Attenuation

The term "natural attenuation" refers to the reliance on natural attenuation processes that include a variety of physical, chemical or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil and ground water. Natural attenuation in ground water systems results from the integration of several subsurface attenuation mechanisms, both contaminant-destructive and –nondestructive. Biodegradation is the most important destructive mechanism, although biotic destruction of some compounds does occur.

Monitored natural attenuation can be used as a stand-alone remedial measure, or as a supplement or follow-up to other active remedial measures, such as source control. OSIER Directive 9200.4-17 defines three lines of evidence that can be used to estimate natural attenuation of chlorinated aliphatic hydrocarbons. These lines of evidence include:

1. Historical data that demonstrate a clear and meaningful trend of decreasing contaminant mass and/or concentration over time,

2. Hydrogeological and geochemical data that can be used to demonstrate indirectly the type(s) of natural attenuation processes active at the Site, and

3. Data from field or microcosm studies that directly demonstrate the occurrence of a particular natural attenuation process and its ability to degrade the contaminants of concern.

Evaluation of the first two criteria generally prove sufficient; however, where results are inadequate or inconclusive, microcosm study data may also be required.

The primary process for biodegradation of chlorinated solvents is reductive dehalogenation. Microorganisms draw energy through oxidation/reduction reactions by transferring an electron from an electron donor (primary substrate) to an electron acceptor. When a chlorinated compound acts as an electron acceptor for the metabolic oxidation of another substrate, a chlorine atom is removed and replaced with a hydrogen atom. Susceptibility of the chlorinated compounds to this process increases with oxidation state [i.e. tetrachloroethene (PCE) will be transformed at a higher rate than trichloroethane (TCE), which will in turn be transformed more quickly than dichloroethene (DCE), etc.]. An accumulation of daughter products [DCE, vinyl chloride (VC)] and an increase in chloride concentration provide evidence of reductive dechlorination. VC may ultimately be reduced to ethene, ethane under methanogenic conditions; however the reductive state of VC makes oxidation under more aerobic and certain anaerobic conditions (i.e., iron reducing), that may exist at the edge of a contaminant plume, the more likely biologically-mediated attenuation pathway.

Microorganisms are believed to be generally reluctant to utilize the more highly oxidized chemical species as a primary substrate; however, as previously stated, under more aerobic and certain anaerobic conditions the more reduced chlorinated ethene (VC) and chlorinated ethane such as 1,2-dichloroethane (DCA) may be oxidized as a primary substrate to carbon dioxide, water and chloride. In many cases under reducing conditions, the more reduced species such as vinyl chloride will accumulate, with oxidation occurring only at the plume edge if more oxidizing conditions can exist.

Co-metabolism may also facilitate destruction of chlorinated solvents. Under these conditions, the chlorinated compound is degraded by an enzyme or cofactor produced by an organism for other purposes. The organism does not gain any benefit from the process. In fact, the cometabolic degradation may be harmful to the organism.

Chlorinated solvent plumes will exhibit three types of behavior, depending on the amount of solvent, the amount of bioavailable organic carbon for use as a primary substrate, the distribution and type of alternate electron acceptors, and concentrations of these acceptors. Type I plumes occur where anthropogenic carbon supplies the primary substrate for reductive dechlorination. Type II plumes rely on naturally occurring organic carbon. Type III behavior dominates where conditions are characterized by inadequate bioavailable carbon and dissolved oxygen

concentrations exceed 1.0 mg/L. Under these aerobic conditions, reductive dechlorination will not occur; however, VC can be rapidly oxidized. In any given plume, different portions of the plume may exhibit different behavior (Wiedemeier, et. al., 1998). Monochlorobenzene (MCB) will also oxidize under aerobic conditions.

During the 1999 sampling, geochemical data from five monitoring well clusters along the general ground water flow path from upgradient of the former Solitron property (MW-8), at the former Solitron property (MW-13 and MW-12), and from downgradient locations (MW-1, MW-3) was collected. These data were evaluated using a screening method developed by Wiedemeier, et al., designed to recognize geochemical environments where reductive dechlorination is plausible (Airforce Protocol, BIOCHLOR). In this process, the presence and magnitude of concentrations of various geochemical parameters are assigned a numeric "score." The presence/absence of chlorinated aliphatic compounds that are daughter products are also scored. The scores are summed, and the sum is evaluated against the following scale:

0 – 5 Inadequate evidence for anaerobic degradation (reductive dechlorination)
6 – 14 Limited evidence for anaerobic degradation
15 – 20 Adequate evidence for anaerobic degradation
>20 Strong evidence for anaerobic degradation

When this screening process is applied to the data collected in 1999 from MW-13C (the well sampled for the full suite of natural attenuation parameters), the resulting score is 32. This score indicates strong evidence that reductive processes have and continue to be a significant factor in contaminant reduction in this area.

At the time of the 1999 sampling, MW-13C was assumed, based on results presented in the prior ESI/RI, to be the center of the plume. Consequently, important parameters such as hydrogen and total organic carbon were only analyzed for this well. Other wells were not scored using the Wiedemeier protocol; however, general geochemistry at other sampling locations supports the conclusions drawn from the MW-13C scoring. In all sampling locations in both the 1999 and 2002 samplings, dissolved oxygen is below the threshold value where interference with reductive dechlorination, or aerobic oxidation of vinyl chloride, would begin. Data collected during the ESI/RI well installation shows that naturally-occurring organic carbon is present in the aquifer matrix in sufficient quantity to provide the primary substrate needed to maintain reductive conditions. This and the chemical data show that, although parent material such as tetrachloroethene and trichloroethane have been reduced the plume is exhibiting Type II behavior, and that natural conditions allowing the oxidation of the accumulated vinyl chloride plume are not likely to occur rapidly, unless aerobic conditions are introduced within the plume area.

The data does provide support that sulfate-reducing and methanogenic conditions do exist in the area. Reductive dechlorination of vinyl chloride will occur under methanogenic conditions to produce ethene, and subsequently ethane. The presence of methane and ethene/ethane support the statement that reductive processes have been and will continue to be a factor in contaminant

reduction. For the contaminant plume centered north of the former Solitron property, vinyl chloride, not indicated as a substance used in the manufacturing process at the former Solitron facility, and most likely resulting from sequential reductive dechlorination of PCE/TCE/DCE from the facility, has accumulated. More data are required to determine the actual process or combination of processes (dilution, oxidation, volatilization, etc.) that are controlling attenuation at the plume edge and the ultimate fate of the vinyl chloride.

6.0 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Solitron Devices, Inc. previously manufactured electronic components for the defense and space industries at the Site. The Site is no longer used for manufacturing activities. The southern building at the Site was sold by Solitron in 1995 and is currently being rented to commercial occupants. The parcel on which the southern building is located, was investigated and found to be clean. The northern building was sold in 1999 to a commercial developer. The developer has repaired and leased the building for commercial use. The property is zoned commercial/ industrial. The City of Riviera Beach has often emphasized the need for the property to be put back into commercial use and has never indicated a desire to consider the property for residential use.

Ground water beneath the facility is currently used as the potable water source for the community. Public water wells are operating within 500 feet of the Site and the water treatment facility operates air stripping equipment due to actual contamination of VOCs in the well field. This is expected to continue until the contaminates are no longer present in the aquifer.

7.0 SUMMARY OF SITE RISKS

7.1 Risk Assessment Overview

The baseline risk assessment is developed to estimate what risks the Site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for this Site.

The risk assessment is based on the data gathered in the ESI/RI and includes analyses of samples of ground water, sediment, and soil. Analyses of ground water samples taken during the 1999 Feasibility Study and 2002 Supplemental Site Investigation are not included due to the timing of the documents. The conclusions made regarding risk do not change based on the 1999 Feasibility Study and 2002 Supplemental Site Investigation data.

Estimates of current risks are based on the ESI/RI data and in the absence of any site-specific remediation, future risk estimates are based on the assumption that current soil and ground water chemical concentrations will persist. Sections 7.2 through 7.6 address the risk assessment evaluation for human health due to exposure to surface soil, sediment, and ground water. Section

7.7 describes the potential impacts on aquatic and terrestrial life associated with contamination at the Site.

7.2 Chemicals of Potential Concern (COPCs) to Human Health

7.2.1 Screening Criteria

The chemicals measured in the various environmental media during the ESI/RI were evaluated for inclusion as chemicals of potential concern in the risk assessment by application of screening criteria. The screening criteria which resulted in elimination and selection of chemicals included the following:

(1) For surface soil data, concentrations of detected chemicals were compared to the EPA Region III risk-based screening criteria for residential soil. Subsurface soil data was compared to the EPA Region III industrial screening values. If the maximum detected concentration was less than a carcinogenic risk level of 1×10^{-6} or hazard quotient of 0.1, the chemical was eliminated from the COPC list.

(2) For ground water data, the maximum detected concentration was compared to the EPA Region III risk-based screening criteria for tap water. If the maximum detected concentration was less than a carcinogenic risk level of 1×10^{-6} or hazard quotient of 0.1, the chemical was eliminated as a COPC for human exposures.

(3) Inorganic chemicals were eliminated from further consideration if the chemical is considered to be an essential nutrient and have relatively low toxicity (i.e., calcium, chloride, magnesium, phosphorus, potassium, and sodium). However, if these chemicals were present at high concentrations, EPA Region 4's Office of Technical Support was consulted prior to eliminating these chemicals from the COPC list.

(4) Inorganic chemicals were eliminated if the maximum detected concentration was less than two times the mean background concentration. Organic chemicals were retained regardless of the mean background concentration because they are not considered to occur naturally.

As a result of applying the above listed criteria, Table 7-1 lists the chemicals of potential concern (COPC) associated with the Site. The chemicals listed in Table 7-1 are of greatest concern because of their toxicity, their relation to background concentrations, their prevalence on-site, and the likelihood of human exposure.

7.2.2 Contaminants of Potential Concern in Surficial Soil

As part of this evaluation, the soil data were sorted by area of concern (North building, South building, surface soil, subsurface soil) and then compared to the other areas to determine if any "hot spots" existed. For surface soil around the North building, four naturally occurring essential

TABLE 7-1. CHEMICALS OF POTENTIAL CONCERN (COPCs)

Chemicals of Potential Concern	Frequency of Detection	Units	Concentration Detected		95 % UCL	Exposure Point Concentration
			Min	Max		
Scenario Timeframe: Current / Future **Medium:** Surface Soil **Exposure Medium:** Surface Soil (North Building)						
Dieldrin	1/8	mg/kg	0.047	0.047	0.055	0.047
Aluminum	8/8	mg/kg	450	8400	6968	6968
Antimony	1/8	mg/kg	13	13	7.43	7.43
Arsenic	1/8	mg/kg	6.4	6.4	3.34	3.34
Chromium	8/8	mg/kg	2.4	790	3081	790
Iron	8/8	mg/kg	800	21000	17327	17327
Manganese	8/8	mg/kg	17	220	211	211
Mercury	3/8	mg/kg	0.27	1.2	0.43	0.43
Nickel	8/8	mg/kg	1.7	750	16555	750
Silver	3/8	mg/kg	1.1	55	2724	55
Thallium	1/8	mg/kg	2.1	2.1	1.23	1.23
Scenario Timeframe: Current / Future **Medium:** Off-site Sediment **Exposure Medium:** Sediment						
Carcinogenic PAHs	6/6	TEF[1]			0.643	0.643
Antimony	1/6	mg/kg	4.3	4.3	4.4	4.3
Chromium	6/6	mg/kg	4.8	280	16524	280
Iron	6/6	mg/kg	740	2500	2455	2455
Mercury	2/6	mg/kg	0.88	1.6	35.7	1.6
Nickel	6/6	mg/kg	2.6	160	1956	160

TABLE 7-1. CHEMICALS OF POTENTIAL CONCERN (COPCs) continued

Chemicals of Potential Concern	Frequency of Detection	Units	Concentration Detected		Arith. Mean	Exposure Point Concentration
			Min	Max		
Scenario Timeframe: Current / Future **Medium:** Ground Water **Exposure Medium:** Ground Water						
Chlorobenzene	5/29	ug/L	98	680	287	287
Chloroform	1/29	ug/L	2	2	2	2
1,2-Dichloroethene (total)	10/29	ug/L	1	320	74	74
Ethylbenzene	3/29	ug/L	3	690	138	138
Tetrachloroethene	1/29	ug/L	8	8	8	8
Trichloroethane	1/29	ug/L	44	44	43	43
Vinyl Chloride	6/29	ug/L	1	730	174	174
bis(2-ethylhexyl) phthalate	3/29	ug/L	10	21	21	21
1,2-dichlorobenzene	5/29	ug/L	2	24	24	24
1,3-dichlorobenzene	1/29	ug/L	3	3	2	2
1,4-dichlorobenzene	4/29	ug/L	2	27	13	13
2,4-dichlorophenol	2/29	ug/L	11	13	13	13
arsenic	1/29	ug/L	12	12	12	12
cadmium	3/29	ug/L	1	4	4	4
chromium	14/29	ug/L	2	14	2.33	2.33
iron	22/29	ug/L	97	4400	2511	2511
thallium	1/29	ug/L	6	6	6	6

nutrients were eliminated, twenty-seven chemicals were eliminated because they occur at concentrations below the Region 3 Risk-Based screening criteria, and eleven chemicals reported in the surface soil on-site meet the COPC criteria (Table 7-1). These eleven chemicals were evaluated in the risk assessment. For surface and subsurface soil around the South building, subsurface soil around the North building, and surface and subsurface soil beneath the north building no chemicals on-site meet the COPC criteria and, therefore, these areas are not listed in Table 7-1.

7.2.3 Contaminants of Potential Concern in Surficial Ground Water

Four naturally occurring essential nutrients were eliminated because they are toxic only at very high doses. Nineteen chemicals were eliminated because they were below the Region 3 Risk-Based screening criteria. Seventeen chemicals reported in the Site-related monitoring wells meet the COPC criteria (Table 7-1). These seventeen chemicals were evaluated in the risk assessment.

7.2.4 Contaminants of Potential Concern in Sediment

Three naturally occurring essential nutrients were eliminated because they are toxic only at very high doses. Eighteen chemicals were eliminated because they were below Region 3 Risk-Based screening criteria. Five carcinogenic polynuclear aromatic hydrocarbons (CPAHs) were combined using a toxicity equivalency factor (TEF) and retained as a COPC (Table 7-1). In addition, five other chemicals meet the COPC criteria (Table 7-1). The CPAHs and five other chemicals were evaluated in the risk assessment.

7.3 Exposure Assessment

7.3.1 Introduction

The objective of the exposure assessment is to estimate the types and magnitudes of exposures to chemicals of potential concern that are present at or migrating from the Site. The results of the exposure assessment are combined with chemical-specific toxicity information to characterize potential risk by quantitatively estimating the potential human health risks associated with chemical exposure. The purpose of this exposure assessment is to estimate the magnitude of potential human exposure to the chemicals of potential concern at the Solitron Devices Site.

The exposure assessment process involves four main steps:

- Characterization of the exposure setting.
- Identification of the exposure pathways.
- Quantification of the exposure.
- Identification of uncertainties in the exposure assessment.

7.3.2 Characterization of the Exposure Setting

The Site is an active industrial/commercial facility that consists of office and manufacturing buildings that are surrounded by paved parking lots or landscaped areas. There are no on-site streams or creeks. A drainage canal is located immediately east of the Site and contains water only intermittently through the year. On-site commercial workers may be exposed to COPCs in surface soil in the North and South building areas.

The Site is likely to remain industrial/commercial in the foreseeable future. However, the Site is currently undergoing some renovations and may continue to in the future. While working on-site, construction workers may be exposed to COPCs in surface and subsurface soil. A future industrial/commercial worker on the Site would likely be exposed to COPCs in a similar pattern as the current worker. Additionally, adults and children may use the nearby drainage canal north of the Site for recreational purposes.

Based on surrounding land use, it is unlikely that the Site may be developed for residential use in the future. However, residential use was evaluated to present the full range of risks.

Currently, the City of Riviera Beach uses ground water from the aquifer of concern. The City well field is close enough to be impacted by on-site contamination if the right combination of wells are pumping. If the City needs to increase pumping in its well field, impacts from this Site may occur. To estimate the risk of ground water from the Site, EPA considered future residents using hypothetically untreated tap water from the Riviera Beach municipal supply. Additionally, if wells were installed on-site, future workers might be exposed to COPCs from the ground water.

7.3.3 Identification of the Exposure Pathways

The conceptual site model for the Solitron Devices Site (Figure 5-1) incorporates information on the potential chemical sources, affected media, release mechanisms, routes of migration, and known or potential human receptors. The purpose of the conceptual site model is to provide a framework with which to identify potential exposure pathways occurring at the Solitron Site. Information presented in the ESI/RI Report, local land and water uses, and potential receptors were used to identify potential exposure pathways at the Site.

The following scenarios, exposure pathways, and routes of exposure were quantitatively evaluated in the baseline risk assessment.

Current/Future Commercial Worker. While working on-site, workers may be exposed to COPCs in surface soil. Potential routes of exposure for the on-site worker included incidental ingestion of, and dermal contact with, COPCs in surface soil. Future workers may hypothetically be exposed to untreated ground water via ingestion.

Current Visitors. Visitors at the Site may be exposed to COPCs in surface soil. Potential

routes of exposure for the on-site visitor included incidental ingestion of, and dermal contact with, COPCs in surface soil.

Current/Future Recreational Person. The drainage canal next to the Site may be used at times for recreational purpose by adults and children. Exposure to contaminants in the surface water and sediments is possible. Potential routes of exposure for the recreational person (adult and child) included incidental ingestion of, and dermal contact with, COPCs in the sediment. No surface water samples were collected from the drainage canal; therefore, this route of exposure will only be assessed qualitatively.

Future Construction Worker. Future construction workers may be exposed to COPCs in surface and subsurface soil while working on-site. Potential exposure routes for the construction worker included incidental ingestion of, dermal contact with, and inhalation of particulate emissions from surface and subsurface soil.

Future On-site Resident. Based on current land use, it is unlikely that the Site will be used for residential uses; however, potential risks to any future residents will be evaluated. Hypothetical future residents may be exposed to COPCs in on-site surface soil. Potential routes of exposure for the future on-site resident (child and adult) included incidental ingestion of, and dermal contact with, COPCs in on-site surface soil and off-site sediment. An additional potential exposure route that was evaluated included ingestion and inhalation of, and dermal contact with Site-related COPCs in ground water.

7.3.4 Quantification of the Exposure

The 95 percent upper confidence limit (UCL) on the arithmetic mean was calculated and used as the exposure point concentration of contaminants of potential concern in each-media evaluated, unless it exceeded the maximum concentration. Where this occurred, the maximum concentration was used as the exposure point concentration for that contaminant. The exposure point concentration for ground water was the arithmetic average of the wells in the highly concentrated area of the plume, based on the 1997 through 1999 data collection results. Monitoring wells used include the following: MW3D, MW12D, MW13S, MW13I, and MW 13D. For COPCs that were not detected in the highly concentrated area of the plume, the maximum value detected in other wells was used as the exposure point concentration. Exposure point concentrations are summarized in the Baseline Risk Assessment. The exposure point concentrations for each of the contaminants of potential concern (Table 7-1) and the exposure assumptions for each pathway were used to estimate the chronic daily intakes for the potentially complete pathways.

The U.S. EPA has developed exposure algorithms for use in calculating chemical intakes through the exposure pathways and routes that are relevant for this Site. Doses are averaged over the number of days of exposure (years of exposure x 365 days/year) to evaluate non-carcinogenic effects, and over a lifetime (70 years x 365 days/year) to evaluate potential carcinogenic health effects. Assumptions used to evaluate each receptor are described below.

- The body weight used for the child (age 1-6) was 15 kg. The body weight used for the adult was 70 kg.

- Exposure to soil occurs 5 days/week for 50 weeks/year (250 days/year) for 25 years for the on-site worker and construction worker, 350 days/year for the on-site resident, 75 days/year for current and future recreational persons, and 52 days/year for the current/future visitor.

- Exposure to ground water occurs 350 days/year for the on-site adult and child resident.

- Incidental soil ingestion occurs at a rate of 50 mg/day for the on-site worker, 100 mg/day for the future adult resident or recreational person, and 200 mg/day for the future child resident or recreational person. Due to intensive contact with soil, it was assumed that a future construction worker ingests 480 mg/day -the reasonable maximum exposure default soil and dust ingestion rate for acute exposures.

- Dermal exposure to soil considered an adsorption factor of 1.0 percent for organics and 0.1 percent for inorganics, with an adherence factor of 1.0 mg/cm^2.

- The drinking water ingestion rate was assumed to be 2 L/day for the adult resident and 1 L/day for the child resident or future worker.

7.3.5 Identification of Uncertainties in the Exposure Assessment

The exposure assumptions directly influence the calculated doses (daily intakes), and ultimately the risk calculations. For the most part, Site-specific data were not available for this baseline risk assessment; therefore, conservative default exposure assumptions were used in calculating exposure doses such as the selection of exposure routes and exposure factors (i.e., contact rate). In most cases, this uncertainty overestimates the most probable realistic exposures and, therefore, overestimates risk. This is appropriate when performing risk assessments of this type so that the risk managers can be reasonably assured that the public risks are not underestimated, and so that risk assessments for different locations and scenarios can be compared. Listed below are a few Site-specific uncertainties:

- The primary source of uncertainty associated with estimating exposure point concentrations involves the statistical methods used to estimate these concentrations and the assumptions inherent in these statistical methods (i.e., it was assumed that the analytical data were log-normally distributed). Generally, an upper bound estimate of the mean concentration is used to represent the exposure point concentration instead of the measured mean concentration. This is done to account for the possibility that the true mean is higher than the measured mean because areas of the Site that were not sampled may have higher constituent concentrations. Ninety-five percent UCL concentrations were calculated in the baseline risk assessment using the H-statistic. The UCL reflects the distribution of the data around the sample mean, and hence, the

uncertainty of the true mean. Exposure point concentrations were assumed to equal the 95 percent UCL, or the maximum detected concentration in cases where the calculated UCL exceeded the maximum.

- COPC concentrations in soil for future use were assumed to be the same as current concentrations, with no adjustment due to migration or degradation. This will result in an overestimation of dose.

- The air pathway was only quantitatively evaluated for the future construction worker. This may result in an underestimation of risk for the remaining exposure scenarios.

7.4 Toxicity Assessment

The purpose of the toxicity assessment is to assign toxicity values (criteria) to each contaminant evaluated in the risk assessment. The toxicity values are used in conjunction with the estimated doses to which a human could be exposed to evaluate the potential human health risk associated with each contaminant. In evaluating potential health risks, both carcinogenic and non-carcinogenic health effects were considered.

Cancer slope factors (CSFs) are developed by EPA under the assumption that the risk of cancer from a given chemical is linearly related to dose. CSFs are developed from laboratory animal studies or human epidemiology studies and classified according to route of administration. The CSF is expressed as $(mg/kg/day)^{-1}$ and when multiplied by the lifetime average daily dose expressed as mg/kg/day will provide an estimate of the probability that the dose will cause cancer during the lifetime of the exposed individual. This increased cancer risk is a probability that is generally expressed in scientific notation (e.g., $1x10^{-6}$ or 1E-6). This is a hypothetical estimate of the upper limit of risk based on very conservative or health protective assumptions and statistical evaluations of data from animal experiments or from epidemiological studies. To state that a chemical exposure causes a $1x10^{-6}$ added upper limit risk of cancer means that if 1,000,000 people are exposed one additional incident of cancer is expected to occur. The calculations and assumptions yield an upper limit estimate which assures that no more than one case is expected and, in fact, there may be no additional cases of cancer. U.S. EPA has established a policy that an upper limit cancer risk falling below or within the range of $1x10^{-6}$ to $1x10^{-4}$ (or 1 in 1,000,000 to 1 in 100,000) is acceptable. It should be noted, however, that the Florida Department of Environmental Protection (FDEP) has established a policy and passed legislation that only risk less than 1×10^{-6} is acceptable. Cancer toxicity data for the COPCs are summarized in Table 7-2.

The toxicity criteria used to evaluate potential non-carcinogenic health effects are reference doses (RfDs). The RfD is expressed as mg/kg/day and represents that dose that has been determined by experimental animal tests or by human observation to not cause adverse health effects, even if the dose is continued for a lifetime. The procedure used to estimate this dose incorporates safety or uncertainty factors that assume it will not over-estimate this safe dose. If the estimated exposure to a chemical expressed as mg/kg/day is less than the RfD, the exposure is not expected to cause any non-carcinogenic effects, even if the exposure is continued for a lifetime. In other words, if the estimated dose divided by the RfD is less than 1.0, there is no concern for adverse non-carcinogenic effects. Non-cancer toxicity data for the COPCs are summarized in Table 7-3.

TABLE 7-2. CANCER TOXICITY DATA SUMMARY

Pathway: Ingestion, Dermal

Chemicals of Potential Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guidance Description	Source Target Organ	Date
1,4-Dichlorobenzene	2.40E-02	2.40E-02	(mg/kg-day)-1	N/A	HEAST	07/00/97
Benzo(a)anthracene	7.30E-01	7.30E-01	(mg/kg-day)-1	B2	NCEA	10/01/98
Benzo(a)pyrene	7.30E+00	8.59E+00	(mg/kg-day)-1	B2	IRIS	11/16/98
Benzo(a and/ or k) fluoranthene	7.00E-02	1.40E-01	(mg/kg-day)-1	B2	NCEA	10/01/98
Bis(2-ethylhexyl)phthalate	1.40E-02	2.80E-02	(mg/kg-day)-1	B2	IRIS	11/16/98
Chloroform	6.10E-03	6.10E-03	(mg/kg-day)-1	B2	IRIS	11/16/98
Chrysene	7.30E-03	1.46E-02	(mg/kg-day)-1	B2	NCEA	10/01/98
Dieldrin	1.60E+01	3.20E+01	(mg/kg-day)-1	B2	IRIS	11/16/98
Indeno(1,2,3-cd)pyrene	7.30E-01	1.46E+00	(mg/kg-day)-1	B2	NCEA	10/01/98
Tetrachloroethene	5.20E-02	5.20E-02	(mg/kg-day)-1	N/A	NCEA	10/01/98
Trichloroethane	1.10E-02	1.12E-02	(mg/kg-day)-1	N/A	NCEA	10/01/98
Vinyl Chloride	1.90E+00	1.90E+00	(mg/kg-day)-1	A	HEAST	07/00/97
Arsenic	1.50E+00	1.58E+00	(mg/kg-day)-1	A	IRIS	11/16/98
Cadmium	N/A	N/A	(mg/kg-day)-1	B1	IRIS	11/16/98
Chromium VI	N/A	N/A	(mg/kg-day)-1	A	IRIS	11/16/98

IRIS - Integrated Risk Information System
HEAST - Health Effects Assessment Summary Tables
NCEA - National Center for Environmental Assessment
Cancer Guidance Description: A - Human Carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of non-carcinogenicity

TABLE 7-2. CANCER TOXICITY DATA SUMMARY (continued)

Pathway: Inhalation

Chemicals of Potential Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guidance Description	Source	Date
1,4-Dichlorobenzene	6.00E-07	$(ug/m^3)^{-1}$	2.20E-02	$(mg/kg\text{-}day)^{-1}$		NCEA	10/1/98
Benzo(a)pyrene	8.86E-04	$(ug/m^3)^{-1}$	3.10E+00	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	10/1/98
Bis(2-ethylhexyl) phthalate	4.00E-06	$(ug/m^3)^{-1}$	1.40E-02	$(mg/kg\text{-}day)^{-1}$	B2	NCEA	10/1/98
Chloroform	2.30E-05	$(ug/m^3)^{-1}$	8.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/16/98
Dieldrin	4.60E-03	$(ug/m^3)^{-1}$	1.60E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/16/98
Tetrachloroethene	6.00E-07	$(ug/m^3)^{-1}$	2.00E-03	$(mg/kg\text{-}day)^{-1}$		NCEA	10/1/98
Trichloroethane	1.70E-06	$(ug/m^3)^{-1}$	6.00E-03	$(mg/kg\text{-}day)^{-1}$		NCEA	10/1/98
Vinyl Chloride	8.57E-05	$(ug/m^3)^{-1}$	3.00E-01	$(mg/kg\text{-}day)^{-1}$	A	HEAST	7/00/97
Arsenic	4.30E-03	$(ug/m^3)^{-1}$	1.51E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/16/98
Cadmium	1.80E-03	$(ug/m^3)^{-1}$	6.30E+00	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	11/16/98
Chromium VI	1.20E-02	$(ug/m^3)^{-1}$	4.10E+01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/16/98

IRIS - Integrated Risk Information System
HEAST - Health Effects Assessment Summary Tables
NCEA - National Center for Environmental Assessment
Cancer Guidance Description:
A - Human Carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of non-carcinogenicity

TABLE 7-3. NON-CANCER TOXICITY DATA SUMMARY

Pathway: Ingestion, Dermal							
Chemicals of Potential Concern	Chronic/ Subchronic	Oral RfD Value (mg/kg-day)	Dermal RfD Value (mg/kg-day)	Primary Target Organ	Combined Uncertainty/ Modifying	Source of RfD Target Organ	Date of RfD Search
1,2 Dichlorobenzene	Chronic	9.00E-02	4.50E-02	None	1000	IRIS	11/16/98
1,2-Dichloroethene	Chronic	9.00E-03	7.20E-03	Blood	1000	HEAST	07/01/97
1,3-Dichlorobenzene	Chronic	3.00E-02	1.50E-02	N/A	N/A	NCEA	10/01/98
1,4-Dichlorobenzene	Chronic	3.00E-02	3.00E-02	Carcin.	N/A	NCEA	10/01/98
2,4-Dichlorophenol	Chronic	3.00E-03	1.50E-03	Immune	100	IRIS	11/16/98
Bis(2-ethylhexyl)ohthalate	Chronic	2.00E-02	1.00E-02	Liver	1000	IRIS	11/16/98
Chlorobenzene	Chronic	2.00E-02	6.20E-03	Liver	1000	IRIS	11/16/98
Chloroform	Chronic	1.00E-02	1.00E-02	Carcin.	1000	IRIS	11/16/98
Chrysene	N/A	N/A	N/A	Carcin.	N/A	N/A	N/A
Dibenzofuran	Chronic	4.00E-03	2.00E-03	N/A.	N/A	NCEA	10/01/98
Dieldrin	Chronic	5.00E-05	2.50E-05	Liver	100	IRIS	11/16/98
Ethylbenzene	Chronic	1.00E-01	9.20E-02	CNS	1000	IRIS	11/16/98
Tetrachloroethene	Chronic	1.00E-02	1.00E-02	Carcin.	1000	IRIS	11/16/98
Trichloroethane	Chronic	6.00E-03	5.88E-03	Carcin.	N/A	NCEA	10/01/98
Vinyl Chloride	N/A	N/A	N/A	Carcin.	N/A	N/A	N/A
Aluminum	Chronic	1.00E+00	2.00E-01	body wt.	N/A	NCEA	10/01/98
Antimony	Chronic	4.00E-04	8.00E-05	Carcin.	1000	IRIS	11/16/98
Arsenic	Chronic	3.00E-04	2.85E-04	skin	3	IRIS	11/16/98
Cadmium	Chronic	5.00E-04	1.00E-04	kidney	10	IRIS	11/16/98
Chromium IV	Chronic	3.00E-03	1.50E-03	skin	900	IRIS	11/16/98
Iron	Chronic	3.00E-01	6.00E-02		N/A	NCEA	10/01/98
Manganese(food)	Chronic	1.40E-01	N/A	N/A	N/A	N/A	N/A
Manganese(non-food)	Chronic	2.00E-02	4.00E-03	CNS	3	IRIS	11/16/98
Mercury	Chronic	1.00E-04	2.00E-05	CNS	30	IRIS	03/26/99
Nickel	Chronic	2.00E-02	6.00E-04	Liver	1	IRIS	11/16/98
Silver	Chronic	5.00E-03	1.05E-03	Liver	3	IRIS	11/16/98
Thallium	Chronic	7.00E-05	1.40E-05		N/A	Other	10/01/98

TABLE 7-3. NON-CANCER TOXICITY DATA SUMMARY (continued)

Pathway: Inhalation

Chemicals of Potential Concern	Chronic/ Subchronic	Inhalation RfC (mg/m^3)	Inhalation RfD Value (mg/kg-day)	Primary Target Organ	Combined Uncertainty/ Modifying	Source of RfD Target Organ	Date of RfD Search
1,2 Dichlorobenzene	Chronic	N/A	9.00E-03			NCEA	10/01/98
1,3-Dichlorobenzene	Chronic	7.00E-03	2.00E-03			NCEA	10/01/98
1,4-Dichlorobenzene	Chronic	8.00E-01	2.29E-01	Liver	100	IRIS	11/16/98
Chlorobenzene	Chronic	1.75E-02	5.00E-03			NCEA	10/01/98
Chloroform	Chronic	3.00E-04	8.60E-05			NCEA	10/01/98
Ethylbenzene	Chronic	1.00E+00	2.90E-01	Respiratory Tract		IRIS	11/16/98
Tetrachloroethene	Chronic	4.90E-01	1.40E-01			NCEA	10/01/98
Aluminum	Chronic	3.50E-03	1.00E-03			NCEA	10/01/98
Chromium IV	Chronic	1.00E-04	3.00E-05	Respiratory Tract	300	IRIS	11/16/98
Manganese(food/ non-food)	Chronic	5.00E-05	1.43E-05	CNS	1000	IRIS	11/16/98

N/A - Not Applicable
IRIS - Integrated Risk Information System
HEAST - Health Effects Assessment Summary Tables
NCEA - National Center for Environmental Assessment
Other - Region III Risk-based Concentration Table

7.5 Risk Characterization

7.5.1 Overview

For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$Risk = CDI \times SF$$

where: Risk = a unitless probability (e.g., 2×10^{-5}) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed as (mg/kg-day)-1.

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of Site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for Site-related exposures is 10^{-4} to 10^{-6}. It should be noted, however, that the FDEP has established a policy and passed legislation that only risk less than 10^{-6} is acceptable

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ<1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI<1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI > 1 indicates that Site-related exposures may present a risk to human health.

The HQ is calculated as follows:

$$\text{Non-cancer HQ} = CDI/RfD$$

where: CDI = Chronic daily intake
RfD = reference dose.

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, sub-chronic, or short-term).

Carcinogenic risks and non-carcinogenic hazards were evaluated for potential exposures to contaminants of potential concern in soil, sediment, and ground water. The receptor population was current/future on-site worker, current visitor, current/future recreational person, future construction worker, and future residents. The results are summarized in Table 7-4 and are described below.

7.5.2 Current/Future On-site Worker

The total incremental lifetime cancer risk for the current/future on-site worker in the North building area through exposure to chemicals in soil was 1.2E-06. This risk is the sum of both exposure pathway risks - incidental ingestion of, and dermal contact with, surface soil in each area of concern. The risk in the North building area was due to incidental ingestion of and dermal contact with arsenic and dieldrin in surface soil. No COPCs were identified for the South building area. In addition, future workers potentially exposed to untreated tap water from the surficial aquifer have an incremental cancer risk of 1.2E-03, primarily due to ingestion of vinyl chloride.

The total hazard index for the current/future on-site workers in the North building area was 0.26, primarily due to the incidental ingestion of and dermal contact with chromium in surface soil. There were no COPCs identified for the South Building. The total HI for future workers (both North and South buildings) potentially ingesting untreated ground water is 1.7, primarily due to incidental ingestion of chlorobenzene and thallium and to the ingestion of chromium in the surface soil.

7.5.3 Current/Future Visitors

The incremental cancer risk for current/future visitors in the North building area was 9.7E-08. The risk in the North building area was primarily due to incidental ingestion of arsenic and dieldrin in surface soil. The total hazard index for current/future visitors to the North building area was 0.06, primarily due to the incidental ingestion of and dermal contact with chromium in surface soil.

7.5.4 Current/Future Recreational Person

The total incremental lifetime cancer risks for current/future recreational adults and children were 9.4E-07 and 1E-06, respectively. The risk for adults and children (age 3 to 6) was due to incidental ingestion of and dermal contact with CPAHs in the sediment in the drainage canal near the Site. The total hazard indices for current/future recreational adults and children (age 3 to 6) were 0.05 and 0.4, respectively. Both values were primarily influenced by the incidental ingestion of and dermal contact with chromium in sediment from the drainage canal adjacent to the Site.

7.5.5 Future On-site Construction Worker

The lifetime excess cancer risk for current/future on-site construction workers in the North building area was 4.7E-07. These risks are the sums of the following pathways: incidental ingestion of surface soil, dermal contact with surface soil, and particulate emissions from surface soil. The risks were due to the inhalation of chromium, and incidental ingestion of and dermal contact with arsenic and dieldrin in the soil in the North building area. The total hazard index for future construction workers in the North building area was 2.2, primarily due to the incidental ingestion of chromium in surface soil. No carcinogenic COPCs were identified in subsurface soil at either the North or South buildings.

7.5.6 Future On-site Resident

The incremental lifetime cancer risks for future on-site adult residents in the North building area was 3.9E-03, and 2E-03 for future on-site child residents (age 1 to 6). The risk to children and adults in the North building area was primarily due to the ingestion and inhalation of contaminants in the ground water. Primary contaminants of concern in the ground water were vinyl chloride and arsenic.

The total hazard index for future on-site adult residents in the North building area was 7.3, primarily due to the ingestion of thallium and inhalation of chlorobenzene in the ground water. The total hazard index for future on-site child residents (age 1 to 6) in the North building area was 16, primarily due to the ingestion of thallium and chlorobenzene in the ground water, and the incidental ingestion of and dermal contact with chromium in surface soil. Since there are no COPCs in the South Building soil, no total hazard index was determined for that area.

7.6 Identification of Uncertainties

Uncertainty is inherent in the risk assessment process. Each of the three components of risk assessment (data evaluation, exposure assumptions, and toxicity criteria) contribute uncertainties. For example, the assumption that ground water concentrations will remain constant over time may overestimate the lifetime exposure. Contaminants are subject to a variety of attenuation processes. In addition, for a risk to exist, both significant exposure to the pollutants of concern and toxicity at these predicted exposure levels must exist. The toxicological uncertainties primarily relate to the methodology by which carcinogenic and non-carcinogenic criteria (i.e., cancer slope factors and reference doses) are developed. In general, the methodology currently used to develop cancer slope factors and reference doses is very conservative, and likely results in an overestimation of human toxicity and resultant risk.

The use of conservative assumptions throughout the risk assessment process are believed to result in an over-estimate of human health risk. Therefore, actual risk may be lower than the estimates presented here but are unlikely to be greater.

TABLE 7-4. SUMMARY OF POTENTIAL CANCER AND NON-CANCER RISKS

Exposure Pathway/Medium	Soil/Sediment Risk			Ground Water Risk			Total
	Ingest.	Inhall.	Dermal	Ingest.	Inhall.	Dermal	
Current Worker							
Cancer	1.01E-06		1.63E-07				1.17E-06
HQ	0.216		0.048				0.264
Future Worker							
Cancer	1.01E-06		1.63E-07	1.23E-03			1.23E-03
HQ	0.216		0.048	0.98			1.244
Current/Future Visitor							
Cancer	8.37E-08		1.36E-08				9.73E-08
HQ	0.045		0.011				0.056
Current/Future Recreational							
Adult-							
Cancer	4.72E-07		4.72E-07				9.44E-07
HQ	0.036		0.009				0.045
Child-							
Cancer	7.35E-07		2.87E-07				1.02E-06
HQ	0.374		0.033				0.407
Future Constr. Worker							
Cancer	3.86E-07	6.87E-08	1.47E-08				4.7E-07
HQ	2.07	0.01	0.12				2.20
Current/Future Resident							
Adult-							
Cancer	2.7E-06		4.62E-07	3.29E-03	5.0E-04	5.8E-05	3.85E-03
HQ	0.603		0.167	3.954	2.324	0.207	7.255
Child-							
Cancer	6.28E-06		4.34E-07	1.92E-03	2.91E-04	2.5E-05	2.24E-03
HQ	5.62		0.61	9.22		0.35	15.8

NOTES: NE Not Evaluated for this receptor.

-- Carcinogenic toxicity value not applicable.

7.7 Ecological Evaluation

7.7.1 Overview

The risk to the environment is determined through the assessment of potentially adverse effects to ecosystems and populations resulting from Site-related contamination using qualitative methods. Soils, ground water, and sediments from the off-site canals were sampled to determine the extent of contamination, as described in Section 5. The following presents a screening-level ecological risk assessment. For reasons that will be outlined below, a more detailed risk assessment was not warranted at this Site.

7.7.2 Identification of Ecological Chemicals of Potential Concern

Ecological chemicals of potential ecological concern (ECOPCs) for each medium were selected by eliminating from the analysis chemicals not detected, essential nutrients considered toxic only at very high concentrations, and by eliminating inorganic analytes whose concentrations were within background concentrations.

7.7.3 Exposure Assessment

Two major habitats (terrestrial and aquatic) are represented on or near the Site. The majority of the Site is covered with asphalt or buildings. Small open maintained grass-covered areas (less than 1 acre) are located around portions of the buildings and along Blue Heron Boulevard on the north side of the property. Several trees (oak species) are located immediately west of the North Building, as well as several landscaping shrubs along the corners of the building. Several large banyan trees are located in the north portion of the Site, as well as a row of palm trees which line Blue Heron Boulevard.

There are no aquatic habitats on the Solitron Devices Site proper. Immediately east of the Site is a drainage canal constructed by the South Florida Water Management District to handle and direct storm water runoff away from the area. This canal contains surface water during portions of the year with high precipitation. Surface water within the canal may also be an expression of the surfical ground water table at times during the year. Drainage from the canal ultimately flows westward approximately 2 miles to a primary canal, C-17. Canal C-17 runs north 3.3 miles to a salinity control structure, S-44, then 1.6 miles east to Lake Worth.

Once the contaminants have reached the habitat, one or more of three possible exposure routes may come into play for a specific receptor. These exposure routes are ingestion, inhalation/respiration, and adsorption (direct contact). The exposure point concentration is the concentration of a contaminant in an environmental media to which a specific receptor is exposed. The maximum concentration detected was used as the exposure point concentration of contaminants of potential concern in each-media evaluated. The exposure point concentrations for each of the contaminants of potential concern and the exposure assumptions for each pathway were used to estimate the chronic daily intakes for the potentially complete pathways.

7.7.4 Ecological Effects Assessment

7.7.4.1 Exposure to Current Sediments

Sediments were evaluated by comparing maximum sediment concentrations with EPA Region 4 Waste Management Division sediment screening levels. Exceedance of these screening levels might indicate a potential for adverse ecological effects (depending upon factors such as frequency of detection, degree of exceedance, etc.), thus indicating a need for more Site-specific ecological investigations, such as toxicity testing. Maximum sediment exposure point concentrations for each chemical of potential concern were compared to screening values for a particular chemical of concern. Surface water was not sampled during the RI, so no current exposure to surface water was evaluated.

7.7.4.2 Exposure to Future Surface Water (Ground Water Surrogate)

Future surface water was evaluated by comparing maximum ground water concentrations with EPA Region 4 Waste Management Division fresh water screening concentrations (chronic). Exceedance of these screening levels might indicate a potential for adverse ecological effects (depending upon factors such as frequency of detection, degree of exceedance, etc.), thus indicating a need for more Site-specific ecological investigations, such as toxicity testing. Maximum ground water exposure point concentrations for each contaminant of concern were compared to screening values for a particular contaminant of concern.

The Westinghouse Savannah River Company (WSRC) surface water screening values were used if no Region IV values were available. The surface water screening values were used based on the assumption that ground water may charge surface waters in the drainage canal; therefore, the potential exists for contaminants in ground water to be a source of contamination to surface waters in the canal habitats.

7.7.4.3 Exposure to Future Sediment (Soil Surrogate)

Future sediments were evaluated by comparing maximum soil concentrations with the Westinghouse Savannah River Company (WSRC) "Ecological Screening Values for Surface Water, Sediment, and Soil". This is due to the potential for soils to eventually become sediments within the nearby canal. Exceedance of these screening levels might indicate a potential for adverse ecological effects (depending upon factors such as frequency of detection, degree of exceedance, etc.), thus indicating a need for more Site-specific ecological investigations, such as toxicity testing.

7.7.5 Risk Characterization

7.7.5.1 Exposure to Current Sediments

Comparison of the concentrations of contaminants of potential concern in sediment with regional screening values was used to assess the likelihood of adverse effects of sediment to wetland and aquatic life. Screening criteria were not available for all detected contaminants. As indicated in Tables 11.1 through11.4 in Appendix B, the risk in sediment is primarily associated with PAHs and pesticides. Those contaminants are not Site-related and are likely present as a result of approved pesticide application and roofing or paving work near the canal. For that reason, a more detailed analysis of the effects of these chemicals was not conducted for this Site. Several inorganics, (chromium, copper, nickel, and mercury) were detected in the sediment at levels of potential concern. Those levels significantly decrease downstream, and due to the intermittent appearance of surface water in the canal, impact from these contaminants should be minimized. It is unlikely that these contaminants in sediment will impact water quality (if undisturbed) because the chemicals typically are very strongly adsorbed to the sediment grains. A risk management decision was made not to further evaluate the ecological impact of canal sediments.

7.7.5.2 Exposure to Future Surface Water (Ground Water Surrogate)

Comparison of the concentrations of contaminants of concern in future surface water (ground water surrogate) with regional screening values was used to assess the likelihood of adverse effects of future surface water to wetland and aquatic life. A number of contaminants in future surface water exceeded screening values. Screening levels were not available for all the detected contaminants; therefore, the contribution of all the contaminants of potential concern could not be evaluated. Despite the absence of some criteria, the results show that effects may occur if ground water contaminants migrate to surface water at current levels. The Site-related chemicals which may contribute the most to the increased risk in surface water are carbon disulfide, chlorobenzene, ethylbenzene, vinyl chloride, xylenes, aluminum, and iron. However, most of the contaminants detected were found in wells at depths of 100 feet. Shallow wells had minimal contamination, therefore, the risk of exposure to ground water contamination should be minimal.

7.7.5.3 Exposure to Surface Soil and Future Sediment (Soil Surrogate)

Of the ECOPCs detected in surface soil, PAHs are the most ubiquitous in the Site's surface soil. However, PAHs are not Site related contaminants. Chromium was higher than screening levels in all surface soil samples. Since most of the Site is paved or occupied by building, there is very little terrestrial habitat space available on the Site. The risk of exposure to Site soils is minimal.

7.7.6 Uncertainty Analysis

The following subsections present the uncertainties that effect the results of this ERA.:

- The use of maximum concentrations in media as the EPCs is a conservative estimation. It is likely that there are only limited locations where the evaluated media is present at concentrations approaching the maximum levels; therefore, this estimate is overly conservative and protective of the environment.

- The ESI soil and sediment sampling efforts were limited in scope. A total of 12 on-site soil samples and 6 downgradient sediment samples were collected. Soil samples were collected from potential "source" areas only; therefore, the areal extent of Site-related contamination is not fully characterized. Only one background/control sample was collected for the surface soil and sediment medium, respectively; therefore, the influence and contribution of surrounding properties to Site conditions is an uncertainty.

- No surface water samples were collected during the ESI/RI; therefore, the pathway could only be evaluated by comparing ground water analytical results to surface water screening values. Actual migration of ground water to the surface water pathway has not been documented.

- The existence of the terrestrial habitat at the Solitron Devices Site is limited to maintained grass-covered area at the facility. The quality and usability of this "habitat" is questionable. Screening of ECOPC were performed as if the habitat is "fully functional."

8.0 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) were developed for the contaminants and media of concern at the Solitron Devices Site. RAOs have been developed to address human health concerns. RAOs have not been established for ecological concerns since Site related contaminants are considered to minimally effect ecological concerns. The two primary RAOs are:

- Reducing the risk to human health from soil and sediment contamination within EPA's acceptable risk range (i.e., total residual cancer risk between $1x10^{-4}$ to $1x10^{-6}$ and maximum individual contaminant HQ of 1), and

- Restoring ground water to MCLs or within EPA's acceptable risk range (i.e., total residual cancer risk between $1x10^{-4}$ to $1x10^{-6}$ and maximum individual contaminant HQ of 1).

Remediation goals (RGs) established to satisfy these RAOs are presented in Table 8-1. A plan view of the area impacted by these goals is provided in Figure 8-1.

As indicated in Table 7-4, human exposure to soils and sediments is below 1x10-6 carcinogenic risk and HQ of 1 for all exposure pathways except residential. Since the property is currently in industrial use, cleanup to residential levels does not appear to be warranted, provided institutional controls are in place to prevent future residential development of the property. However, the area where surface soil COCs (chromium and arsenic) are located is relatively small (estimated at <150 square feet). It would be less expensive to remove the small amount of contaminated soil than to require institutional controls and ongoing five-year reviews at the Site.

For non-carcinogenic risk in soils/sediments, contaminant levels which yield a HQ for an individual contaminant equal to 1 is generally considered acceptable unless there is reason to believe that a large number of contaminants affect the same target organ. The only cumulative soil hazard quotient above 1 is for the future construction worker. Details of the risk assessment indicate that the only organ with a cumulative HQ above 1 is the skin (HQ=1.61). This exposure can be prevented with the soil removal described above. RGs for soil have been established to protect human health from soil contaminants.

Primary maximum contaminant levels (MCLs) are used when available for RGs. If Primary maximum contaminant levels (MCLs) are not available, contaminant concentrations based on health effects were considered. Figure 8-1 shows the approximate area of MCL exceedances based on the most recent data for each well including 1997, 1998, 1999, and 2002 sampling information. Benzene was the only additional contaminant detected in 1999 and in 2002 above the drinking water MCL. Benzene was detected at 5.7 µg/L in MW-13C in 1999, and 32 µg/L (using low-flow sampling technique) in MW-13C in 2002. A RG for Benzene was added to Table 8-1.

TABLE 8-1: REMEDIATION GOALS

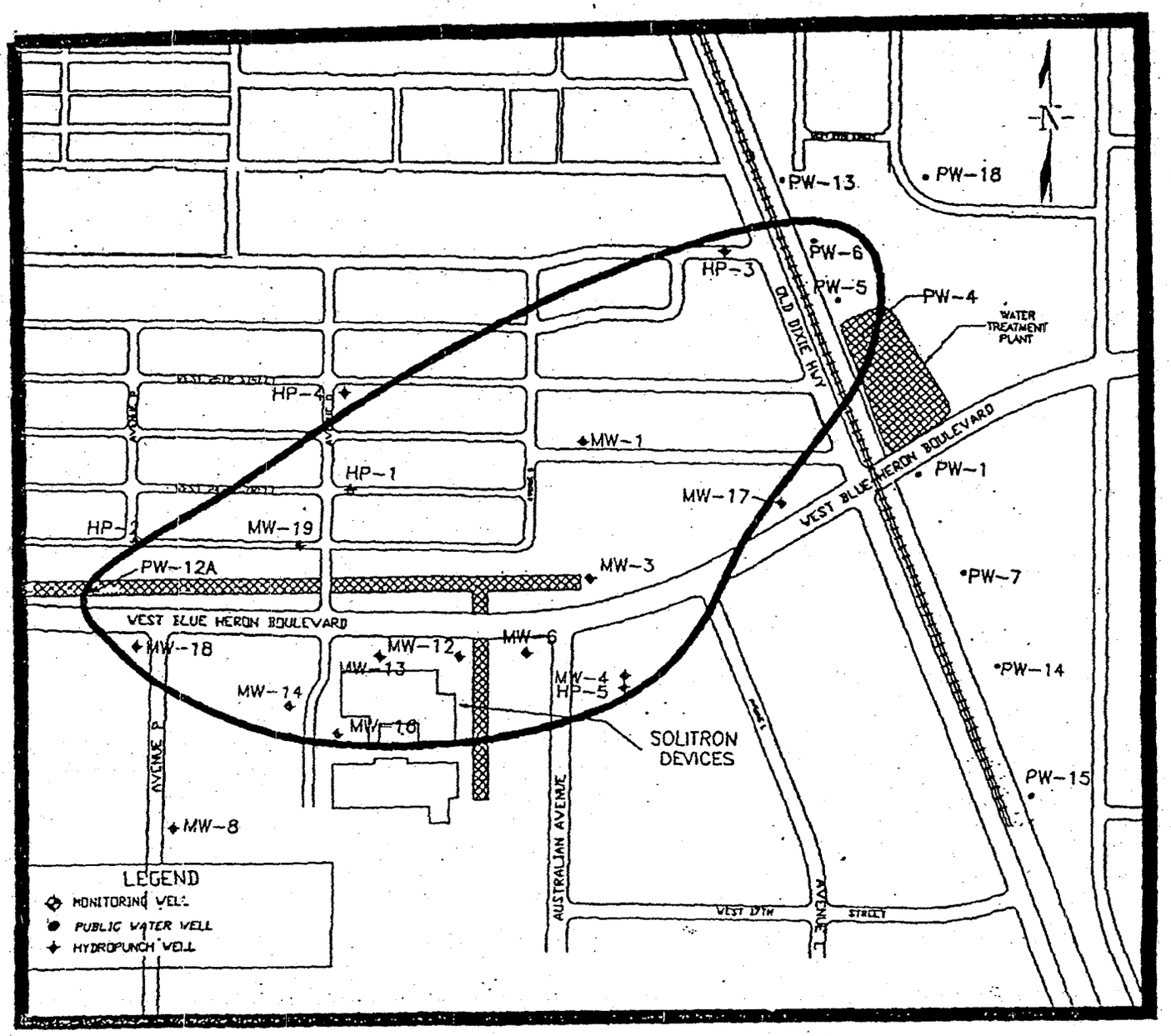
Chemicals of Concern	Federal or State ARARs or TBCs	Health-Based Remedial Goal Concentr. (2)	Max Detected (7)	Selected Remediation Goal
SURFACE SOIL	(mg/kg)			
Arsenic	2.1[8]	---	6.8	2.1
Chromium	210[9]	230	790	210
GROUND WATER	(ug/L)			
Benzene	1 [3]		32	1
Chlorobenzene	100 [3]	140	680	100
Chloroform	6 [4]	3	3	NR
1,2-Dichloroethene(Total)	70 [3]	140	470	70
Tetrachloroethene	3 [3]	2	14	3
Trichloroethane	3 [3]	6	70	3
Vinyl Chloride	1 [3]	0.05	2100	1
Bis(2-ethylhexyl)phthalat	6 [3]	40	21	6
1,4-Dichlorobenzene	75 [3]	20	31	NR
2,4-Dichlorophenol	4 [4]	40	13	NR
Arsenic	10 [6]	0.1	12	10
Cadmium	5 [3]	10	4	NR
Iron	300 [5]	4650	4400	NR
Thallium	2 [3]	3	6	2

NA -- Not Available
NR -- Not Required

NOTES:

1) Practical Quantitation Levels (PQLs) are an estimate of the lowest concentration usually quantifiable by most analytical laboratories. The source of information was the FDEP Groundwater Guidance Concentrations, June 1994.
2) Health based concentrations are based on $1x10^{-6}$ carcinogenic risk or a HQ of 1 for non-carcinogens.
3) Value based on a Federal and State Primary Maximum Contaminant Level (MCL).
4) Value based on Florida Groundwater Guidance Concentrations (To Be Considered (TBCs).
5) Value based on a State Secondary Maximum Contaminant Level (MCL).
6) Federal MCL changed since Risk Assessment completed.
7) Value based on consideration of all 1997, 1998, 1999, and 2002 (low flow) sampling events.
8) Value based on FDEP bioavailability study, proposed FDEP Soil Cleanup Target Level for residential exposure.
9) Value based on FDEP Soil Cleanup Target Level for residential exposure.

FIGURE 8-1: AREA OF GROUND WATER TO BE TREATED



9.0 DESCRIPTION OF ALTERNATIVES

9.1 Overview

The 2002 Supplemental FS report included an evaluation of five alternatives for cleanup of contamination in ground water. Institutional Controls were included in Alternatives 2-5 to prevent contaminated ground water exposure during the implementation of the remedial action. These alternatives represent the range of remedial actions considered appropriate for the Site. As required by CERCLA, a no further action alternative was evaluated to serve as a basis for comparison with the other active cleanup methods. Potential Applicable or Relevant and Appropriate Requirements (ARARs) are summarized for each alternative.

Although the 2002 Supplemental FS anticipated that institutional controls would be used to limit the use of the Site to commercial/industrial, EPA has determined that removal of a small quantity of soil (<20 cubic yards) can be performed to eliminate the need for institutional controls on land use (Appendix A to this document). Eliminating institutional controls on the property will satisfy community concerns and eliminate the need for five-year remedy reviews once the ground water contamination has been addressed.

Interim Well Field Impacts:
EPA and FDEP have documented that actual contamination originating from the Solitron Devices Site has contributed to past contamination in the well field which warranted the use of air stripping equipment in the water treatment plant in order to meet the potable water needs of the City of Riviera Beach. Four wells (PW-4, PW-5, PW-6, and PW-12A) continue to show impacts from Site contamination. Those impacts will be lessened and eliminated when the selected remedy is implemented. During the interim period between selection of the remedy and isolation of Site-related contaminants from the well field, the water treatment plant intends to continue to operated and maintain the air strippers in order to remove VOCs from the potable water supply.

Continuing to operate the air strippers is likely more cost effective than replacing wells or purchasing water from another source so contaminated wells can be taken out of service. However, EPA tested the combined influent to the water treatment plant (WTP) for five consecutive days in February 2002. Those test results are summarized in Table 9-1. Although contamination was present in individual wells, once the well water was combined at the water treatment plant, the influent met drinking water standards prior to entering the air strippers. Since historical data suggests that the contaminated ground water plume is declining, the air stripping step at the water treatment plant may no longer be necessary to meet drinking water standards for volatile organic substances, although the WTP may elect to continue use to meet other water quality standards.

TABLE 9-1. WATER TREATMENT PLANT COMBINED INFLUENT SAMPLING RESULTS

Parameters	FDEP GCTLs	EPA Cleanup Levels	TCINFDY1 07/15/2002	TCINFDY2 07/16/2002	TCINFDY3 07/17/2002	TCINFDY4 07/18/2002	TCINFDY5 07/19/2002
Volatile Organics (ug/L)							
Chlorobenzene	100	NE	0.19J	0.38J	0.22J	0.18J	0.43J
1,2-Dichlorobenzene	600	NE	--	0.12J	--	--	0.13J
1,1-Dichloroethene	7	NE	0.19J	0.19J	--	0.17J	--
1,2-Dichloroethene	63	70	0.35J	2.5	0.10J	1.6	0.63
Methyl T-butyl ether	50	NE	--	--	--	--	0.11J
Toluene	40	NE	0.14J	0.13J	0.10J	0.12J	0.12J
Trichloroethane	3	3	--	1.6	--	1.5	--
Vinyl Chloride	1	1	0.56	0.95	--	0.12J	--
Miscellaneous Volatile Compounds (ug/L)							
Unknown Compound	NE	NE	--	--	--	0.57J	--
Metals (ug/L)							
Barium	2000	NE	9.1	6.1	19	9.4	9.2
Calcium	NE	NE	100,000	86,000	120,000	100,000	92,000
Iron	300	NE	140	160	110	130	130
Magnesium	NE	NE	3,500	2,200	6,200	3,500	3,400
Manganese	50	NE	8.5	6.5	8.4	8.2	6.3
Potassium	NE	NE	1,000	--	5,400	1,100	2,600
Sodium	160,000	NE	24,000	14,000	38,000	25,000	20,000
Strontium	4,200	NE	1,300	950	1,400	1,300	1,000

NOTES:

FDEP GCTLs	Florida Department pf Environmental Protection, Groundwater and Surface Water Cleanup Target Levels (GCTLS), Groundwater Criteria effective August 5, 1999.
TC	Trans Circuits, Inc.
TCINFDY#	Influent water treatment plant sample and collection date.
PW	Municipal well.
ug/L	Micrograms per liter.
J	Estimated Value
NE	Not Established
--	Indicates the material was analyzed for but not detected above the sample quantitation limit (SQL).

** Data provided in Table 3-5 of Data Evaluation Report, Revision 0, Trans Circuits Site Remedial Design, November 12, 2002.

Alternatives
The five alternatives that have been identified for evaluation are listed below.

Alternative 1: No-action
Alternative 2: Aquifer Restoration with In-situ Treatment.
Alternative 3: Aquifer Restoration with Water System Supplementation.
Alternative 4: Aquifer Restoration with Enhanced Bioremediation.
Alternative 5: Aquifer Restoration with Ground Water Re-injection.

9.2 Alternative 1: No-action

CERCLA requires that EPA consider the no-action alternative to serve as a basis against which other alternatives can be compared. Under the no action alternative, the Site would be left as is. This alternative would not be protective of public health and the environment and would not satisfy ARARs. Chemical-specific ARARs for this alternative include Federal Water Quality Criteria, Federal Primary Drinking Water Standards, Florida Drinking Water Standards, and Florida Well Head Protection Regulations.

9.3 Alternative 2: Aquifer Restoration with In-situ Treatment

Alternative 2 consists of the following remedial actions:

- Removal and off-site disposal of contaminated surface soils behind the north building;
- Contaminated ground water in-situ treatment using a recirculation well system; and
- Natural attenuation of contaminants outside capture zone of recirculation well system.

Under this alternative future human exposure to surface soil contaminants (arsenic and chromium) would be eliminated by excavating the top two feet of soil in the stained soil area on the south side of the north building. The soil would be disposed of off-site at an appropriate landfill.

Under this alternative future human exposure to ground water contaminants would be eliminated through restoration of ground water quality at the Site by recovery and in-situ treatment of the source of contaminated ground water, using a recirculation well system. The recovery and treatment system would consist of ground water recovery, air sparging, in-situ air stripping, and soil vapor extraction. The existing ordinances requiring connection to the public water supply and prohibiting installation of any wells for potable use in the vicinity of the plume would continue to be enforced by the County and City, as applicable.

The remedy includes three proven technologies combined in a single in-situ recovery and treatment system. The air sparging component results in lifting the water table. This lifting of the water in the well causes a net reduction in head at the well location, which results in water

flowing toward the well. Vacuum pressure (the vapor extraction component) is applied atop of the well point to extract vapor from the subsurface. The negative pressure from vacuum extraction results in water suction that creates additional water lifting (mounding) and a net lower gradient. This further enlarges the radius of influence.

A submersible pump is placed at the bottom of the well to recirculate water from the bottom of the well and the formation to the top of the well where it is discharged through a spray head nozzle. This process is analogous to the operation of an ex-situ air stripping system. Enhanced stripping via air sparging near the bottom of the well will occur simultaneously. In essence, the well will act as a subsurface air stripping tower. In addition to the air stripping effected by the pumping/cascading, a portion of the pumped, stripped, highly oxygenated water will flow down the well annulus out and over the "mounded" water back in to the aquifer. This will set up a circulation or flushing zone surrounding the well that will further enhance cleanup. The concentration of the air and VOC mixture would not exceed discharge limits and could be emitted directly to the atmosphere.

Modeling to estimate optimum pumping flow rates, well locations, contaminant transport, and concentrations has not been performed and would be done during the Remedial Design phase. The modeling effort would also include evaluation of extraction rates for public supply wells in order to reduce contamination migration to public supply wells, specifically PW-4, PW-5A, PW-6 and PW-12. For the purposes of cost estimation, 10 locations have been assumed for the in-situ recirculation wells.

Performance monitoring during the implementation of this alternative would optimize the operation of the recovery and treatment system, track cleanup of the plume, verify containment of the plume during the remediation. Monitoring would include water level measurements, dissolved oxygen, subsurface pressure, and the collection and analysis of samples from ground water monitoring wells and process flow lines. The overall approach to monitoring is consistent with that presented in Methods for Monitoring Pump and Treat Performance (USEPA 1994d).

Ground water monitoring would use existing and newly installed monitoring wells and piezometers. For the cost estimate, it was assumed that 11 locations with 23 monitoring wells would be sampled as part of the performance monitoring plan – 5 existing wells and 6 new locations with 3-nested wells each. The actual number of monitoring wells to be sampled and the locations and specifications for the newly determined wells (depth, screened interval, well construction materials, etc.) would be determined during the Remedial Design phase and documented in the long-term monitoring plan. For the purposes of cost estimation, it is assumed that 6 new locations each will have 3-nested wells.

Monitoring frequency would vary with time. During initial system start-up and equilibration, monitoring of water levels and subsurface pressure would be nearly continuous, using pressure transducer and data loggers. This initial period was assumed to last no more than 2 weeks, after which monitoring would shift sequentially to daily, weekly, monthly, and finally quarterly measurements.

A ground water monitoring plan would be established during remedial design. For cost estimating purposes, it was assumed that for the first 6 months after start up of the treatment system, samples would be collected monthly from the ground water monitoring wells and extraction wells. After 6 months, the monitoring wells would be sampled biannually, and the extraction wells would be sampled quarterly.

The monitoring wells outside the treatment area would be monitored to evaluate the effectiveness of natural attenuation processes. The current data indicate that the plume is subject to on-going natural attenuation processes. Ground water analytical data obtained at the Site indicate that dissolved VOCs are being degraded to carbon dioxide (CO2) and methane (CH4) due to the presence of naturally occurring, biologically mediated oxidation-reduction reactions. However, based on the limited data currently available, a maximum of the 30 years as allowed per CERCLA guidance has been considered for purpose of cost estimation.

The performance monitoring program would be a dynamic program, refined and optimized as a better understanding of aquifer characteristics and Site-specific natural attenuation processes is obtained. The program would need to be flexible and readily amendable to changes in scope, objectives, or methodology in response to data trends.

The performance monitoring program would be designed to provide sufficient lead time to identify significant differences, evaluate contingent response actions, and implement necessary actions. Preliminary criteria that would indicate a significant difference from the design of selected alternative would be:

- Concentrations in the public supply wells start to increase above levels that cannot be removed by existing WTP processes or balancing of influent supply wells;
- Increased or decreased contaminant concentrations in the treatment area; and
- Changes in the predicted direction and rate of the plume migration, as determined based on the additional monitoring data and modeling completed during the design phase.

The continued operation of the City air stripper towers for additional treatment of the supply water does not appear warranted and was not considered under this alternative, although further evaluation during remedial design may be appropriate.

This alternative would be expected to be effective in limiting future human health risks associated with ground water consumption and direct contact with surface soils. Protection would occur as a result of direct remedial action. This alternative would achieve the soil and ground water RAOs of limiting potential future human exposure, and attaining compliance with chemical-specific and location-specific ARARs through soil removal and ground water restoration.

Chemical-specific ARARs for this alternative include Federal Water Quality Criteria, Federal Primary Drinking Water Standards, Florida Drinking Water Standards, and the Florida Well Head Protection Regulation. Location-specific ARARs associated with the aquifer restoration and institutional controls include the Florida Well Head Protection Regulation. Action-specific ARARs for this alternative would include the National Primary and Secondary Ambient Air Quality Standards, NESHAPs, the Clean Water Act, RCRA Generation, Treatment, Storage and Disposal regulations and Hazardous Waste Permitting, equivalent State of Florida Regulations, and OSHA regulations for work performed at the Site during monitoring and maintenance activities. Compliance with these action-specific ARARs would be accomplished through necessary documentation, permitting processes, treatment system design, work practices, and required monitoring as defined in a RD/RA work plan and Site-specific HASP. See Table 10-1for more information.

This technology would be expected to effectively reduce ground water contaminants within the capture zone of the in-situ treatment wells to meet ARARs. That portion of the plume outside of the capture zone would be treated by mineralization of constituents through natural attenuation. Ground water monitoring would be used to evaluate the long-term performance of this alternative.

Ground water treatment using in-situ recirculation wells would be effective in reducing the toxicity and volume of COCs in the extracted dissolved phase ground water. Active pumping can be used to provide hydraulic containment, thus this alternative would reduce the mobility of the dissolved phase plume. Natural attenuation would reduce the COC toxicity and volume in the downgradient portion of the plume.

Potential exposures to on-site workers conducting monitoring activities would be mitigated by the use of PPE, as specified in a Site-specific HASP. There would be no short-term environmental impacts associated with this alternative.

The proposed alternative is easy to implement and is reliable. Technical expertise and equipment are readily available, and would require a short period to implement. Monitoring of the off gas to assure the effectiveness of the treatment process while in operation would be required.

Costs associated with this alternative include capital costs for equipment and installation, and O&M costs (including ongoing monitoring). Capital costs are estimated to be $1,857,586. The estimated O&M and monitoring cost of this alternative is $2,336,659. The total estimated cost is $4,194,245, with a present worth cost, based on 5% for 8 years of active treatment and 30 years of monitoring is $3,537,678.

9.4 Alternative 3: Aquifer Restoration with Water System Supplementation

Alternative 3 consists of the following remedial actions:

- Removal and off-site disposal of contaminated surface soils behind the north building;

- Contaminated ground water extraction, treatment with a pair of low-profile air-stripping towers with trays set in series, and disposal by delivery of treated ground water to the municipal water treatment plant to supplement the City's water needs; and

- Natural attenuation of contaminants outside capture zone of the extraction wells.

Under this alternative future human exposure to surface soil contaminants (arsenic and chromium) would be eliminated by excavating the top two feet of soil in the stained soil area on the south side of the north building. The soil would be disposed of off-site at an appropriate landfill.

Future human exposure to ground water contaminants would be eliminated through restoration of ground water quality in the plume area by removal and treatment of the source area contaminated ground water. The ground water treatment system would consist of extraction, followed by treatment consisting of a pair of low-profile air-stripping trays set in series, and disposal by delivery of treated ground water to the municipal water plant to supplement the City's water needs. The existing ordinances requiring connection to the public water supply and prohibiting installation of any wells for potable use in the vicinity of the plume would continue to be enforced by the County and City, as applicable.

For the purposes of the detailed analysis of alternatives, it has been assumed that nested wells screened in the source area with a total pumping flow rate of 500 gallons per minute (gpm) will provide enough capture. The assumed locations of the extraction wells will be in the vicinity of Lift Station #2 and PW-10 (not in service) which appears to be in the area of highest concentration of COCs. For cost purposes, 3 locations have been assumed for the extraction wells, each with 2-nested wells.

The ground water would be pretreated to remove iron, carbonates, etc., (if necessary), then pumped to the low profile air stripper trays. In the low profile air stripper tray the ground water flows across trays that are perforated with small holes, over a weir, and through a downcomer, to the next lower tray, tray by tray, until the treated water flows from the bottom of the air stripper. Filtered and compressed air is bubbled through the holes in the trays, stopping the liquid from dripping through them. The VOCs are transferred from the liquid to the gas phase as the air is bubbled through the water on the trays. The gas then exits the top of the column.

The treated ground water would then be pumped from the bottom of the first low profile stripper through a second redundant air stripper unit before it is delivered to the WTP. An additional benefit of this alternative is the ability to contain and treat the plume, while making the water immediately available for introduction to the WTP.

Modeling to estimate optimum pumping flow rates, well locations, contaminant transport, and concentrations has not been performed and would be done during the Remedial Design phase. The modeling effort would also include evaluation of extraction rates for public supply wells in order to continue reduction of contamination migration to public supply wells, specifically PW-4,

PW-5A, PW-6 and PW-12. The extraction rates for the public wells PW-4, 5, 6, and 12A would be reduced if necessary to further reduce the contribution of contaminants to the combined raw water influent to the WTP. The supplemented water delivered to the WTP will balance any such reductions, to minimize interferences with the WTP operations; however, as with all the treatment alternatives, some coordination with the WTP would be required.

Performance monitoring during the implementation of this alternative would optimize the operation of the extraction wells and treatment system, track cleanup of the plume, verify containment of the plume during the remediation, and demonstrate successful treatment of the extracted ground water before discharge. Monitoring would include water level measurements and the collection and analysis of samples from ground water monitoring wells and process flow lines within the treatment plant.

Ground water monitoring would use existing and newly installed monitoring wells and piezometers. For the cost estimate, it was assumed that 11 locations with 23 monitoring wells would be sampled as part of the performance monitoring plan – 5 existing wells and 6 new locations with 3-nested wells each. The actual number of monitoring wells to be sampled and the locations and specifications for the newly determined wells (depth, screened interval, well construction materials, etc.) would be determined during the Remedial Design phase and documented in the long-term monitoring plan.

Water table elevation monitoring frequency would vary with time. During initial system start-up and equilibration, monitoring of water levels would be nearly continuous, using pressure transducer and data loggers. This initial period was assumed to last no more than two weeks, after which monitoring would shift sequentially to daily, weekly, monthly, and finally quarterly measurements.

A ground water monitoring plan would be established during remedial design. For cost estimating purposes, it was assumed that for the first 6 months after start up of the treatment system, samples would be collected monthly from the ground water monitoring wells, and extraction wells. After 6 months, the monitoring wells would be sampled biannually, and the extraction wells would be sampled quarterly.

The monitoring wells outside the treatment area would be monitored to evaluate the effectiveness of natural attenuation processes. The plume is subject to on-going natural attenuation processes. Ground water analytical data obtained at the Site indicate that dissolved VOCs are being degraded to carbon dioxide (CO2) and methane (CH4) due to the presence of naturally occurring, biologically mediated oxidation-reduction reactions. Based on the limited data currently available, a maximum of the 30 years as allowed per CERCLA guidance has been considered for purpose of cost estimation.

The performance monitoring program would be a dynamic program, refined and optimized as a better understanding of aquifer characteristics and Site-specific natural attenuation processes is obtained. The program would need to be flexible and readily amendable to changes in scope,

objectives, or methodology in response to data trends.

The performance monitoring program would be designed to provide sufficient lead time to identify significant differences, evaluate contingent response actions, and implement necessary actions. Preliminary criteria that would indicate a significant difference from the design of selected alternative would be:

- Concentrations in the public supply wells start to increase above levels that cannot be removed by existing WTP processes or balancing of influent supply wells;
- Increased or decreased contaminant concentrations in the treatment area; and
- Changes in the predicted direction and rate of the plume migration, as determined based on the additional monitoring data and modeling completed during the design phase.

The continued operation of the City air stripper towers for additional treatment of the supply water does not appear warranted and was not considered under this alternative, although further evaluation during remedial design may be appropriate.

This alternative would be expected to be effective in limiting future human health risks associated with ground water consumption and direct contact with surface soils. Protection would occur as a result of direct remedial action. This alternative would achieve the soil and ground water RAOs of limiting potential future human exposure, and attaining compliance with chemical-specific and location-specific ARARs through soil removal and ground water restoration.

Chemical-specific ARARs for this alternative include Federal Water Quality Criteria, Federal Primary Drinking Water Standards, Florida Drinking Water Standards, and Florida Well Head Protection Regulation. Location-specific ARARs associated with the aquifer restoration with water system supplementation and institutional controls alternative include the Florida Well Head Protection Regulation. Action-specific ARARs for this alternative would include the National Primary and Secondary Ambient Air Quality Standards, NESHAPs, the Clean Water Act, RCRA Generation, Treatment, Storage and Disposal regulations and Hazardous Waste Permitting, equivalent State of Florida Regulations, and OSHA regulations for work performed at the Site during monitoring and maintenance activities. Compliance with these action-specific ARARs would be accomplished through necessary documentation, permitting processes, treatment system design, work practices, and required monitoring as defined in a USEPA-approved RD/RA work plan and Site-specific HASP. See Table 10-1for more information.

This technology would be expected to effectively reduce ground water contaminants within the capture zone of the extraction wells to meet ARARs. That portion of the plume outside of the capture zone would be treated by mineralization of constituents through natural attenuation. Ground water monitoring would be used to evaluate the long-term performance of this alternative.

Ground water treatment using the air stripping technology would be effective in reducing the toxicity and volume of COCs in the extracted dissolved phase ground water. Active pumping can be used to provide hydraulic containment, thus this alternative would reduce the mobility of the dissolved phase plume. Natural attenuation would reduce the COC toxicity and volume in the outer portion of the plume.

Potential exposures to on-site workers conducting monitoring activities would be mitigated by the use of PPE, as specified in a Site-specific HASP. There would be no short-term environmental impacts associated with this alternative.

The proposed extraction and treatment technologies are easy to implement and are reliable. Technical expertise and equipment are readily available, and would require a short period to implement. Monitoring of influent and effluent to assure the effectiveness of treatment process while in operation would be required.

The total cost associated with this alternative includes, capital costs for equipment and installation, and O&M and monitoring costs. Capital costs are estimated to be $1,292,245. The estimated O&M and monitoring cost of this alternative is $3,866,021. The total estimated cost is $5,158,266 for the active part of this alternative, with a present worth, based on 5% for 10 years of active treatment and 30 years of monitoring is $4,094,899.

9.5 Alternative 4: Aquifer Restoration with Enhanced Biodegradation

Alternative 4 consists of the following remedial actions:

- Removal and off-site disposal of contaminated surface soils behind the north building;
- Contaminated ground water extraction, treatment with a pair of low-profile air-stripping towers with trays set in series, and re-injection, with increased oxygenation of the re-injected ground water; and
- Natural attenuation of contaminants outside the capture zone of the extraction well system.

Under this alternative future human exposure to surface soil contaminants (arsenic and chromium) would be eliminated by excavating the top two feet of soil in the stained soil area on the south side of the north building. The soil would be disposed of off-site at an appropriate landfill.

Future human exposure to ground water contaminants would be eliminated through restoration of ground water quality at the Site by removal and treatment of the source contaminated ground water. The ground water treatment system would consist of extraction, followed by treatment consisting of a pair of low profile air-stripping trays set in series and re-injection. The enhanced

biodegradation will be accomplished by increased oxygenation of the treated ground water at the point of injection using in-place gas infusers. The existing ordinances requiring connection to the public water supply and prohibiting the installation of any wells for potable use in the vicinity of the plume would continue to be enforced by the County and City, as applicable.

The pumping flow rates from the extraction wells are assumed to be similar to the pumping rates of the City wells. For the purposes of cost estimation, 3 locations have been assumed for the extractions wells, each with 2- nested wells and 2 locations for the injection wells.

The ground water would be pretreated to remove iron, carbonates, etc., (if necessary), then pumped to the air stripper. In the low profile air stripping tray, the ground water flows across trays that are perforated with small holes, over a weir, and through a downcomer, to the next lower tray, tray by tray, until the treated water flows from the bottom of the air stripper. Filtered and compressed air is bubbled through the holes in the trays, stopping the liquid from dripping through them. The VOCs are transferred from the liquid to the gas phase as the air is bubbled through the water on the trays. The gas then exits the top of the column.

The stripped ground water would be pumped from the bottom of the air stripper sump through a second redundant air stripper unit to ensure effluent quality required for reinjection. The treated ground water will be pumped to the injection wells. The wells will have gas infusers that will allow the transfer of the gas into the ground water without bubbles. The iSOC™ is a specially designed, highly structured, microporous mass transfer device designed for use in enhanced ground water remediation. The iSOC™, or in situ Submerged Oxygen Curtain, is based on Gas inFusion™ technology, which is patented worldwide. Essentially, this technology involves using hydrophobic, microporous hollow fibers to infuse ground water with any gas. The iSOC™ unit is filled with these fibers. The desired gas is piped into the unit saturating the fibers, using a standard compressed gas cylinder and regulator arrangement. The fibers in the iSOC™ unit provide a large surface area to volume ratio to allow intimate contact between the gas and ground water, which results in an ultra-efficient mass transfer. The oxygenated water will enhanced the biodegradation of the vinyl chloride to carbon dioxide.

Modeling to estimate optimum pumping flow rates, well locations, contaminant transport, and concentrations has not been performed and would be done during the Remedial Design phase. The modeling effort would also include evaluation of extraction rates for public supply wells in order to reduce contamination migration to public supply wells, specifically PW-4, PW-5A, PW-6 and PW-12. The extraction rates for the public wells PW-4, 5, 6, and 12A would be reduced if necessary to further reduce the contribution of contaminants to the combined raw water influent to the WTP.

Performance monitoring during the implementation of this alternative would optimize the operation of the extraction well(s) and treatment system, track cleanup of the plume, verify containment of the plume during the remediation, and demonstrate successful treatment of the extracted ground water before discharge. Monitoring would include water level measurements and the collection and analysis of samples from ground water monitoring wells and process flow

lines within the treatment plant. The overall approach to monitoring is consistent with that presented in Methods for Monitoring Pump and Treat Performance (USEPA 1994d).

Ground water monitoring would use existing and newly installed monitoring wells and piezometers. For the cost estimate, it was assumed that 11 locations with 23 monitoring wells would be sampled as part of the performance monitoring plan – 5 existing wells and 6 new locations with 3-nested wells each. The actual number of monitoring wells to be sampled and the locations and specifications for the newly determined wells (depth, screened interval, well construction materials, etc.) would be determined during the Remedial Design phase and documented in the long-term monitoring plan. For the purposes of cost estimation, it is assumed that 6 new locations each will have 3-nested wells.

Monitoring frequency would vary with time. During initial system start-up and equilibration, monitoring of water levels would be nearly continuous, using pressure transducer and data loggers. This initial period was assumed to last no more than 2 weeks, after which monitoring would shift sequentially to daily, weekly, monthly, and finally quarterly measurements.

For the first 6 months after start up of the treatment system, samples would be collected monthly from the ground water monitoring wells, extraction wells, and treatment system effluent. After 6 months, the monitoring wells would be sampled biannually, and the extraction wells and treatment system effluent would be sampled quarterly (or as required by EPA, the Water Management District and/or FDEP).

The monitoring wells outside the treatment area would be monitored to evaluate the effectiveness of natural attenuation processes. The plume is subject to on-going natural attenuation processes. Ground water analytical data obtained at the Site indicate that dissolved VOCs are being degraded to carbon dioxide (CO_2) and methane (CH_4) due to the presence of naturally occurring, biologically mediated oxidation-reduction reactions. Based on the limited data currently available, a maximum of the 30 years as allowed per CERCLA guidance has been considered for purpose of cost estimation.

The performance monitoring program would be a dynamic program, refined and optimized as a better understanding of aquifer characteristics and Site-specific natural attenuation processes is obtained. The program would need to be flexible and readily amendable to changes in scope, objectives, or methodology in response to data trends.

The performance monitoring program would be designed to provide sufficient lead time to identify significant differences, evaluate contingent response actions, and implement necessary actions. Preliminary criteria that would indicate a significant difference from the design of selected alternative would be:

- Concentrations in the public supply wells start to increase above levels that cannot be removed by existing WTP processes or balancing of influent supply wells;

- Increased or decreased contaminant concentrations in the treatment area; and
- Changes in the predicted direction and rate of the plume migration, as determined based on the additional monitoring data and modeling completed during the design phase.

The continued operation of the City air stripper towers for additional treatment of the supply water does not appear warranted and was not considered under this alternative, although further evaluation during remedial design may be appropriate.

This alternative would be expected to be effective in limiting future human health risks associated with ground water consumption and direct contact with surface soils. Protection would occur as a result of direct remedial action. This alternative would achieve the soil and ground water RAOs of limiting potential future human exposure, and attaining compliance with chemical-specific and location-specific ARARs through soil removal and ground water restoration.

Chemical-specific ARARs for this alternative include Federal Water Quality Criteria, Federal Primary Drinking Water Standards, Florida Drinking Water Standards, and Florida Well Head Protection Regulation. Location-specific ARARs associated with the aquifer restoration with enhanced biodegradation, reinjection and institutional controls include the Florida Well Head Protection Regulation. Action-specific ARARs for this alternative would include the National Primary and Secondary Ambient Air Quality Standards, NESHAPs, the Clean Water Act, RCRA Generation, Treatment, Storage and Disposal regulations and Hazardous Waste Permitting, equivalent State of Florida Regulations, and OSHA regulations for work performed at the Site during monitoring and maintenance activities. Compliance with these action-specific ARARs would be accomplished through necessary documentation, permitting processes, treatment system design, work practices, and required monitoring as defined in a USEPA-approved RD/RA work plan and Site-specific HASP. See Table 10-1for more information.

This technology would be expected to effectively reduce ground water contaminants within the capture zone of the extraction well to meet ARARs. That portion of the plume outside of the capture zone would be treated by mineralization of constituents through natural attenuation and dilution. Ground water monitoring would be used to evaluate the long-term performance of this alternative.

Ground water treatment using air stripping technology would be effective in reducing the toxicity and volume of COCs in the extracted dissolved phase ground water. Active pumping can be used to provide hydraulic containment, thus this alternative would reduce the mobility of the dissolved phase plume. Natural attenuation would reduce the COC toxicity and volume in the downgradient portion of the plume.

Potential exposures to on-site workers conducting monitoring activities would be mitigated by the use of PPE, as specified in a Site-specific HASP. There would be no short-term environmental impacts associated with this alternative.

The proposed extraction and treatment technologies are easy to implement and are reliable. Technical expertise and equipment are readily available, and would require a short period to implement. Monitoring of influent and effluent to assure the effectiveness of treatment process while in operation would be required. Approval would be necessary from the Water Management District and/or FDEP for re-injection of the treated ground water.

Costs associated with this alternative include capital costs for equipment and installation, and O&M and monitoring costs (including ongoing monitoring). Capital costs are estimated to be $1,454,027. The estimated O&M cost of this alternative is $3,469,311. The total estimated cost is $4,923,338, with a present worth, based on 5% for 8 years of active treatment and 30 years monitoring is $4,049,189.

9.6 Alternative 5: Aquifer Restoration with Ground Water Reinjection

Alternative 5 consists of the following remedial actions:

- Removal and off-site disposal of contaminated surface soils behind the north building;
- Contaminated ground water extraction, treatment with a pair of low-profile air-stripping towers with trays set in series, and re-injection of treated ground water; and
- Natural attenuation of contaminants outside capture zone of extraction well system.

Under this alternative future human exposure to surface soil contaminants (arsenic and chromium) would be eliminated by excavating the top two feet of soil in the stained soil area on the south side of the north building. The soil would be disposed of off-site at an appropriate landfill.

Future human exposure to contaminants would be eliminated through restoration of ground water quality at the Site by removal and treatment of the source contaminated ground water. The ground water treatment system would consist of extraction, followed by treatment consisting of a pair of air stripping columns set in series and re-injection. For the purposes of cost estimation, 3 locations have been assumed for the extractions wells, each with 2-nested wells and 2 locations for the injection wells. The existing ordinances requiring connection to the public water supply and prohibiting installation of any wells for potable use in the vicinity of the plume would continue to be enforced by the County and City, as applicable.

The ground water would be pretreated to remove iron, carbonates, etc., (if necessary), then pumped to the air stripper. The stripper column is a downward flow, packed tower with an inside diameter of about 2 feet. Ground water enters the column at the top and flows downward by gravity to the pump well at the bottom of the column. Filtered and compressed air enters at the bottom section above the pump well and rises through the packing, thus stripping out VOCs from ground water. The gaseous mixture flows through a de-mister, where moisture is removed. The

gas then exits the top of the column. The packing inside the column is to provide ample surface area for air/ground water contact. The concentration of the air and VOC mixture would not exceed discharge limits and could be emitted directly to the atmosphere.

The stripped ground water would be pumped from the bottom of the stripper column through a second redundant air stripper unit to ensure effluent quality required for reinjection. The treated ground water will be pumped to the injection wells.

Modeling to estimate optimum pumping flow rates, well locations, contaminant transport, and concentrations has not been performed and would be done during the Remedial Design phase. The modeling effort would also include evaluation of extraction rates for public supply wells in order to reduce contamination migration to public supply wells, specifically PW-4, PW-5A, PW-6 and PW-12.

Performance monitoring during the implementation of this alternative would optimize the operation of the extraction wells and treatment system, track cleanup of the plume, verify containment of the plume during the remediation, and demonstrate successful treatment of the extracted ground water before discharge. Monitoring would include water level measurements and the collection and analysis of samples from ground water monitoring wells and process flow lines within the treatment plant.

Ground water monitoring would use existing and newly installed monitoring wells and piezometers. For the cost estimate, it was assumed that 11 locations with 23 monitoring wells would be sampled as part of the performance monitoring plan – 5 existing wells and 6 new locations with 3-nested wells each. The actual number of monitoring wells to be sampled and the locations and specifications for the newly determined wells (depth, screened interval, well construction materials, etc.) would be determined during the Remedial Design phase and documented in the long-term monitoring plan. For the purposes of cost estimation, it is assumed that 6 new locations each will have 3-nested wells.

Monitoring frequency would vary with time. During initial system start-up and equilibration, monitoring of water levels would be nearly as continuous, using pressure transducer and data loggers. This initial period was assumed to last no more than 2 weeks, after which monitoring would shift sequentially to daily, weekly, monthly, and finally quarterly measurements.

For the first 6 months after start up of the treatment system, samples would be collected monthly from the ground water monitoring wells, extraction wells, and treatment system effluent. After 6 months, the monitoring wells would be sampled biannually, and the extraction wells and treatment system effluent would be sampled quarterly (or as required by EPA, the Water Management District and/or FDEP).

The monitoring wells outside the treatment area will be monitored to evaluate the effectiveness of natural attenuation processes. The plume is subject to on-going natural attenuation processes. Ground water analytical data obtained at the Site indicate that dissolved VOCs are being

degraded to carbon dioxide (CO_2) and methane (CH_4) due to the presence of naturally occurring, biologically mediated oxidation-reduction reactions.

The performance monitoring program would be a dynamic program, refined and optimized as a better understanding of aquifer characteristics and Site-specific natural attenuation processes is obtained. The program would need to be flexible and readily amendable to changes in scope, objectives, or methodology in response to data trends.

The performance monitoring program would be designed to provide sufficient lead time to identify significant differences, evaluate contingent response actions, and implement necessary actions. Preliminary criteria that would indicate a significant difference from the design of selected alternative would be:

- Concentrations in the public supply wells start to increase above levels that cannot be removed by existing WTP processes or balancing of influent supply wells;
- Increased or decreased contaminant concentrations in the treatment area; and
- Changes in the predicted direction and rate of the plume migration, as determined based on the additional monitoring data and modeling completed during the design phase.

The continued operation of the City air stripper towers for additional treatment of the supply water does not appear warranted and was not considered under this alternative, although further evaluation during remedial design may be appropriate.

Additional detailed modeling would be conducted during the remedial design phase, as necessary. The active remediation period for the source area was estimated to be 10 years using the limited information available. For the Site to achieve cleanup goals, the time required is estimated to be greater than 30 years. A maximum of 30 years as allowed per CERCLA guidance has been considered for purposes of cost estimation.

This alternative would be expected to be effective in limiting future human health risks associated with ground water consumption and direct contact with surface soils. Protection would occur as a result of direct remedial action. This alternative would achieve the soil and ground water RAOs of limiting potential future human exposure, and attaining compliance with chemical-specific and location-specific ARARs through soil removal and ground water restoration.

Chemical-specific ARARs for this alternative include Federal Water Quality Criteria, Federal Primary Drinking Water Standards, Florida Drinking Water Standards, and Florida Well Head Protection Regulation. Location-specific ARARs associated with the aquifer restoration with ground water reinjection and institutional controls include the Florida Well Head Protection Regulation. Action-specific ARARs for this alternative would include the National Primary and Secondary Ambient Air Quality Standards, NESHAPs, the Clean Water Act, RCRA Generation,

Treatment, Storage and Disposal regulations and Hazardous Waste Permitting, equivalent State of Florida Regulations, and OSHA regulations for work performed at the Site during monitoring and maintenance activities. Compliance with these action-specific ARARs would be accomplished through necessary documentation, permitting processes, treatment system design, work practices, and required monitoring as defined in a USEPA-approved RD/RA work plan and Site-specific HASP. See Table 10-1for more information.

This technology would be expected to effectively reduce ground water contaminants within the capture zone of the extraction well to meet ARARs. That portion of the plume outside of the capture zone would be treated by mineralization of constituents through natural attenuation. Ground water monitoring would be used to evaluate the long-term performance of this alternative.

Ground water treatment using air stripping/carbon adsorption technology would be effective in reducing the toxicity and volume of COCs in the extracted dissolved phase ground water. Active pumping can be used to provide hydraulic containment, thus this alternative would reduce the mobility of the dissolved phase plume. Natural attenuation would reduce the COC toxicity and volume in the downgradient portion of the plume.

Potential exposures to on-site workers conducting monitoring activities would be mitigated by the use of PPE, as specified in a Site-specific HASP. There would be no short-term environmental impacts associated with this alternative.

The proposed extraction and treatment technologies are easy to implement and are reliable. Technical expertise and equipment are readily available, and would require a short period to implement. Monitoring of influent and effluent to assure the effectiveness of treatment process while in operation would be required. Approval would be necessary from the Water Management District and/or FDEP for re-injection of the treated ground water.

Costs associated with this alternative include capital costs for equipment and installation, O&M and monitoring. Capital costs are estimated to be $1,320,434. The estimated O&M and monitoring cost of this alternative is $4,201,030. The total estimated cost is $5,521,464, with a present worth cost, based on 5% for 10 years of active treatment and 30 years of monitoring is $4,381,773.

10.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

10.1 Statutory Balancing Criteria

This section of the ROD provides the basis for determining which alternative provides the best balance with respect to the statutory balancing criteria in Section 121 of CERCLA, 42 U.S.C. § 9621, and in the NCP, 40 CFR § 300.430. The major objective of the Supplemental Feasibility Study (SFS), after investigating contamination north of the facility, was to develop, screen, and evaluate alternatives for the remediation of the Solitron Devices Site. A variety of alternatives

and technologies were identified as candidates to remediate the contamination at the Solitron Devices Site. These were screened based on their feasibility with respect to the contaminants present and the Site characteristics. After the initial screening, the remaining alternatives/ technologies were combined into potential remedial alternatives and evaluated in detail. One remedial alternative was selected from the screening process using the following nine evaluation criteria:

- overall protection of human health and the environment;
- compliance with applicable or relevant and appropriate requirements (ARARS);
- long-term effectiveness and permanence;
- reduction of toxicity, mobility, or volume of hazardous substances or contaminants;
- short-term effectiveness or the impacts a remedy might have on the community, workers, or the environment during the course of implementation;
- implementability, that is, the administrative or technical capacity to carry out the alternative;
- cost-effectiveness considering costs for construction, operation, and maintenance of the alternative over the life of the project;
- acceptance by the State, and
- acceptance by the Community.

The NCP categorizes the nine criteria into three groups:

(1) Threshold Criteria - overall protection of human health and the environment and compliance with ARARs (or invoking a waiver) are threshold criteria that must be satisfied in order for an alternative to be eligible for selection;

(2) Primary Balancing Criteria - long-term effectiveness and permanence; reduction of toxicity, mobility or volume; short-term effectiveness; implementability and cost are primary balancing factors used to weigh major trade-offs among alternative hazardous waste management strategies; and

(3) Modifying Criteria - state and community acceptance are modifying criteria that are formally taken into account after public comments are received on the proposed plan and incorporated into the ROD.

The following analysis is a summary of the evaluation of alternatives for remediating the Solitron Devices Site under each of the criteria. A comparison is made between each of the alternatives for achievement of a specific criterion.

10.2 Threshold Criteria

10.2.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

All of the alternatives, except the no-action alternative, are protective of human health and the environment by eliminating, reducing, or controlling risks posed by the Site. Alternatives 2 through 5 provide for extraction and treatment of ground water in the most toxic portion of the plume, and removal and disposal of contaminated surface soil. Since Alternative 1 did not pass this threshold criteria for providing protection of human health and the environment, it can be eliminated from further consideration.

10.2.2 Compliance With ARARs

Section 121(d) of CERCLA and NCP§300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site address problems or situations sufficiently similar to those encountered at the site and that their use is well suited to the particular site.

To-Be-Considered Criteria (TBCs) are non-promulgated advisories and guidance that are not legally binding, but should be considered in determining the necessary level of cleanup for protection of human health or the environment. While TBCs do not have the status of ARARS, EPA's approach to determining if a remedial action is protective of human health and the environment involves consideration of TBCs along with ARARs.

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely on the basis of location. Examples of location-specific ARARs include state and federal requirements to protect floodplains, critical habitats, and wetlands, and solid and hazardous waste facility siting criteria. Table 10-1 summarizes the potential location-specific ARARs and TBCs for the Solitron Devices Site.

Action-specific ARARs are technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are triggered by the particular remedial activities that are selected to accomplish a remedy. Since there are usually several alternative actions for any remedial site, various requirements can be ARARs. Table 10-1 lists potential action-specific ARARs and TBCs for the Solitron Devices Site.

Chemical-specific ARARs are specific numerical quantity restrictions on individually-listed contaminants in specific media. Examples of chemical-specific ARARs include the MCLs specified under the Safe Drinking Water Act as well as the ambient water quality criteria that are enumerated under the Clean Water Act. Because there are usually numerous contaminants of potential concern for any remedial site, various numerical quantity requirements can be ARARs. Table 10-1 lists potential chemical-specific ARARs and TBCs for the Solitron Devices Site.

All alternatives, except the no-action alternative, had common ARARs associated with the drinking water standards for ground water. The use of air stripping or volatile extraction would require the consideration of emission standards for volatile organics in alternatives 2 through 5. Alternatives 3 through 5 have common ground water discharge ARARs. Acquisition of permits would be necessary for any re-injection or discharge of treated water to the water treatment plant.

All alternatives can be designed to attain their respective Federal and State ARARs. However, the amount of time required to meet ARARs varies.

10.3 Primary Balancing Criteria

10.3.1 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Table 10-1: Potential ARARs and TBCs

Requirements	Requirement Synopsis	Application to the RI/FS
Chemical Specific Federal and State Requirements		
Federal Ground water Classification 55FR Part 8733	Classifies aquifers based on quality and use.	Aquifer is federally classified as a G-1 (sole-source) aquifer
Safe Drinking Water Act National Primary Drinking Water Standards 40 CFR Parts 141	MCLs have been set for toxic compounds as enforceable standards for public drinking water systems.	The surficial aquifer is a source of drinking water. The drinking water system has been affected by contamination in the aquifer.
Clean Water Act Federal Water Quality Criteria 40 CFR Part 129 National Pollution Discharge Elimination System (NPDES) 40 CFR Part 122, 125 National Pretreatment Standards 40 CFR Part 403	Effluent limitations must meet Best Achievable Technology (BAT) goals. Water Quality Criteria for ambient water quality are provided for toxic chemicals.	Any remedial actions requiring discharges to surface water bodies will have Ambient Water Quality Criteria (AWQCs) as a potential goal. Treated effluent may be discharged to surface water Treated effluent may be discharged to POTW
Clean Air Act National Primary and Secondary Ambient Air Quality Standards 40 CFR Part 50 National Emissions Standards for Hazardous Air Pollutants (NESHAPS) 40 CFR Part 61		Treatment may result in discharge of contaminants to air Treatment process may result in vinyl chloride emissions
Florida Drinking Water Standards, Monitoring and Reporting Chapter 62-550 FAC	MCLs have been set for toxic compounds as enforceable standards for public drinking water systems.	The surficial aquifer is the source of drinking water. The drinking water system has been affected by contamination in the aquifer.
Florida Air Emission Standards Chapter 62-521 FAC		Treatment may result in discharge of contaminants to air
Location-Specific Federal and State Requirements		
Florida Well Head Protection Chapter 62-204 FAC		Site is located in a well head protection area.
Action-Specific Federal and State Requirements		
RCRA Location Requirements 40 CFR 264.18(c)	Establish minimum requirements for design, construction, and operation of a facility where treatment, storage, or disposal of hazardous waste will be located.	Treatment, disposal, and storage of hazardous materials may take place during remediation of the Site.
Endangered Species Act 16 U.S.C. 1531 et seq. 50 CFR Part 402	Action must avoid jeopardizing the continued existence of listed endangered or threatened species or modification of their habitat.	Endangered species may be present in the vicinity of the Site.
Clean Air Act National Ambient Air Quality Standards 40 CFR Part 50	Establish emissions standards to protect public health and public welfare. These standards are national limitations on ambient air intended to protect health and welfare.	Remedial actions may include technologies which have air emissions.

Table 10-1: Potential ARARs and TBCs

Requirements	Requirement Synopsis	Application to the RI/FS
Florida Rules on Permits Title 62 Chapter 62-4	Establish requirements and procedures for all permitting required by the FDEP, and define anti-degradation requirements.	Requirements may apply to Site depending upon remedial actions and discharge options selected. Permits are not required for on-site actions.
Florida Ambient Air Quality Standards Title 62 Chapter 62-2	Establish ambient air quality standards and ambient test methods.	Remedial actions may include technologies which have air emissions.
Florida Underground Injection Control Regulations	Establish construction standards, permitting procedures, and operating requirements for underground injection wells.	Remedial actions may include underground injection as a disposal option for treated effluent.

* These requirements will be further specified during the remedial design process.

Alternatives 2 through 5 actively address ground water contamination (i.e., through pumping and treating ground water or extracting volatiles). All alternatives include passively addressing ground water contamination outside the capture zone of the extraction or re-circulation wells (i.e., through natural attenuation). Ground water remediation, whether active or passive, will be effective and permanent in restoring ground-water quality by attaining drinking water standards in a reasonable time frame.

10.3.2 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of the remedy.

Alternatives 2 through 5 would provide comparable reductions in the toxicity, mobility, and volume of ground-water contamination at the Site, although the time to reduce toxicity, mobility and volume varies. All alternatives transfer VOCs from ground water to air, rather than destroying the contaminants.

10.3.3 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Risks to the community and Site workers posed by the implementation of all alternatives are minimal. Engineering controls can be expected to control emissions to air and water. Time for restoration of the surficial ground water quality to MCLs is reasonable (i.e., 8 to 10 years for hot spots and source areas) for all alternatives. During the implementation of all the alternatives, workers will be protected from possible impacts caused by construction or O&M activities through the use of personal protective equipment.

10.3.4 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility , and coordination with other government entities are also considered.

The implementability of alternative 2 is uncertain. Re-circulation wells require ample vadose zone and will be limited in the area that can be impacted by each well. Volatiles would be discharged in a residential area, which creates additional concerns.

Alternatives 3 through 5 may be impacted by where wells can be located in the residential area. Alternatives 3 would be impacted by problems with modification of the WTP permit to use the water from the system. Alternative 4 would be impacted by the permit required for underground injection of oxygen and reinjection of water. Alternative 5 would be impacted by the permit required for underground reinjection of water.

10.3.5 Cost

A summary of the present worth costs which includes the capital as well as the annual operation and maintenance cost for each of the alternatives is presented in Table 10-2. These costs were presented in the FS. The present worth cleanup costs needed to meet performance standards are within the range of +50% to -30% accuracy.

TABLE 10-2: COMPARISON OF COSTS

Alternative	Years	Capital Cost	O&M / MNA Costs		Total Costs	Rate	Present Worth
			Annual	Total			
1. No-Action	-	-	-	-	-	0 %	-
2. Aquifer restoration with insitu treatment	8	$1,857,586	$ 204,220	$ 1,633,756		5 %	
MNA	30		$ 23,430	$ 702,903	$ 4,194,245	5 %	$ 3,537,678
3. Aquifer restoration and Water Supplementation	10	$1,625,689	$ 316,312	$ 3,163,118		5 %	
MNA	30		$ 23,430	$ 702,903	$ 5,158,266	5 %	$ 4,094,189
4. Aquifer restoration, Enhanced Bio with GW re-injection	8	$1,799,653	$ 345,801	$ 2,766,408		5 %	
MNA	30		$ 23,430	$ 702,903	$ 4,923,338	5 %	$ 4,049,191
5. Aquifer restoration with GW re-injection	10	$1,320,434	$ 349,813	$ 3,498,127		5 %	
MNA	30		$ 23,430	$ 702,903	$ 5,521,464	5 %	$ 4,381,773

10.4 Modifying Criteria

10.4.1 State Acceptance

The State of Florida, as represented by the Southeast District Office of FDEP, has been the support agency during the RI/FS process for the Solitron Devices Site. In accordance with 40 C.F.R. § 300.430, FDEP as the support agency, has provided input during this process by reviewing major documents in the Administrative Record. Although FDEP has not indicated an objection to the overall approach of the selected remedy, FDEP has not yet concurred with this ROD.

10.4.2 Community Acceptance

Based on comments expressed at the April 29, 2004, public meeting and receipt of three written documents with comments during the comment period, it appears that the community does agree with the selected remedy. Specific responses to issues raised by the community can be found in Appendix A, The Responsiveness Summary. The City of Riviera Beach has expressed concern

that EPA has not held the PRPs responsible for reimbursing the City for continued operation of the air stripper towers at the WTP. The potentially responsible parties have provided documentation which indicates that the air stripper towers at the WTP are not necessary to provide drinking water that meets Primary Drinking Water Standards. EPA understands that representatives of the City of Riviera Beach and representatives of Honeywell are meeting to find ways to resolve this issue.

10.5 Comparison of Alternatives

All ground water alternatives would be effective in the long run by reducing contaminant concentrations in ground water. Alternative 2 and Alternative 4 are estimated to require 8 years to remediate the hot spot area, whereas alternatives 3 and 5 are estimated to require 10 years to remediate the hot spot area. All alternatives have MNA as a component to the remedy, which indicates that the fringe areas of the plume will take more time to reach ground water cleanup goals.

The adequacy and reliability of the pump and treat technologies in alternatives 3 through 5 have been well proven for the chemicals of concern. Alternative 2 is approximately $500,000 less than the next highest alternative. However, EPA Region 4's experience with recirculation wells in South Florida has not been favorable.

In alternative 3, modification of the WTP permit to use the water from the system would be difficult and time consuming. Alternatives 4 and 5 both require a permit for reinjection of water. By also injecting oxygen, the time required to clean up the hot spot area can be reduced by two years. Alternative 4 should allow for cleanup of more contaminated water with less reliance on monitored natural attenuation, and is preferred over other alternatives.

11.0 PRINCIPAL THREAT WASTES

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP §300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contaminants to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material.

There is no known principal waste threat remaining at the Solitron Devices Site. The remedial action is being selected to address residual ground water contamination from the Site and minor surface soil contamination that could act as a direct contact threat if residential use of the property was desired in the future.

TABLE 10-3 COMPARATIVE ANALYSIS OF ALTERNATIVES

Criteria	**Alternative 1** No Action	**Alternative 2** Aquifer Restoration with In-situ Treatment	**Alternative 3** Aquifer Restoration with Water System Supplementation	**Alternative 4** Aquifer Restoration with Enhanced Bioremediation	**Alternative 5** Aquifer Restoration with Ground Water Re-injection
OVERALL PROTECTIVENESS					
Human Health Protection					
•Direct Contact/Soil Ingestion	No reduction in Risk	Soil Removal reduces direct contact/soil ingestion risk to less than 1×10^{-6}	Same as Alternate 2	Same as Alternate 2	Same as Alternate 2
•Ground Water Ingestion for Current Users	No Reduction in Risk	Current Users on municipal supply. Combined influent not > MCLs	Same as Alternate 2	Same as Alternate 2	Same as Alternate 2
•Ground Water Ingestion for Potential Future Users	No Reduction in Risk	Plume fringes controlled by public well field operation. Remedy will achieve MCLs in area of highest conc. in 8 years.	Plume fringes controlled by public well field operation. Remedy will achieve MCLs in area of highest conc. in 10 years.	Same as Alternative 2	Same as Alternative 3
Environmental Protection					
	Allows continued contamination of public well field	Reduction contaminant plume will reduce and eliminate what can be pulled in by well field.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
COMPLIANCE WITH ARARs					
Chemical-Specific ARARs	Ground water will continue to exceed MCLs		Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
Location-Specific ARARs	No location-specific ARARs	No location-specific ARARs	No location-specific ARARs	No location-specific ARARs	No location-specific ARARs
Action-Specific ARARs	No action-specific ARARs	Will meet air standards.	Will meet air standards. Modify WTP permit to accept water.	Will meet air standards. UIC permit required.	Will meet air standards. UIC permit required.
Other Criteria and Guidance	Soil Concentrations exceed FDEP SCTLs for residential use	Risk eliminated through soil removal	Risk eliminated	Risk eliminated	Risk eliminated

TABLE 10-3 COMPARATIVE ANALYSIS OF ALTERNATIVES

Criteria	**Alternative 1** No Action	**Alternative 2** Aquifer Restoration with In-situ Treatment	**Alternative 3** Aquifer Restoration with Water System Supplementation	**Alternative 4** Aquifer Restoration with Enhanced Bioremediation	**Alternative 5** Aquifer Restoration with Ground Water Re-injection
LONG-TERM EFFECTIVENESS AND PERMANENCE					
Magnitude of Residual Risk					
•Direct Contact/Soil Ingestion	Residual risk from soil will prevent residential use only	Risk eliminated by removal.	Risk eliminated by removal.	Risk eliminated by removal.	Risk eliminated by removal.
•Ground Water Ingestion for Current Users	All users on municipal supply. Potable water blended, no current risk.	All users on municipal supply. Potable water blended, no current risk.	All users on municipal supply. Potable water blended, no current risk.	All users on municipal supply. Potable water blended, no current risk.	All users on municipal supply. Potable water blended, no current risk.
•Ground Water Ingestion for Potential Future Users	Risk remains with plume in well field.	Risk minimized by extracting ground water and stripping VOCs. GW hot spot treated in 8 years; whole area <30 years.	Risk minimized by extracting ground water and stripping VOCs. GW hot spot treated in 10 years; whole area <30 years.	Risk minimized by extracting ground water and stripping VOCs. GW hot spot treated in 8 years; whole area <30 years.	Risk minimized by extracting ground water and stripping VOCs. GW hot spot treated in 10 years; whole area <30 years.
Adequacy and Reliability of Controls	No controls over remaining contamination. No reliability.	No controls needed when soil removed. Recirculation wells less reliable than pump and treat.	No controls needed when soil removed. Pump and treat reliable. Ability to provide treated water to the City less reliable.	No controls needed when soil removed. Pump and treat and injection reliable. Ability to improve biodegradation with oxygen injection unproved.	No controls needed when soil removed. Pump and treat and injection reliable.

TABLE 10-3 COMPARATIVE ANALYSIS OF ALTERNATIVES

Criteria	**Alternative 1** No Action	**Alternative 2** Aquifer Restoration with In-situ Treatment	**Alternative 3** Aquifer Restoration with Water System Supplementation	**Alternative 4** Aquifer Restoration with Enhanced Bioremediation	**Alternative 5** Aquifer Restoration with Ground Water Re-injection
REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT					
Treatment Process Used	None.	Recirculation wells./ soil removal.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Amount Destroyed or Treated	None.	20 cy soil removed to landfill. VOC contamination moved from ground water to air.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Reduction of Toxicity, Mobility, or Volume	None.	Reduced volume and toxicity of ground water. Toxicity of soil reduced.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Irreversible Treatment	None.	Vapor extraction and air stripping are irreversible. Soil removal irreversible.	Air Stripping irreversible. Soil removal irreversible.	Same as Alternative 3.	Same as Alternative 3.
Type and Quantity of Residuals Remaining After Treatment	Small qty. contaminants in soil. Hot spot and continuing effects from vinyl chloride in ground water.	Lower concentrations areas remain in ground water due to inability to draw plume away from well field. Will monitor for long-term remediation.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.

TABLE 10-3 COMPARATIVE ANALYSIS OF ALTERNATIVES

Criteria	**Alternative 1** No Action	**Alternative 2** Aquifer Restoration with In-situ Treatment	**Alternative 3** Aquifer Restoration with Water System Supplementation	**Alternative 4** Aquifer Restoration with Enhanced Bioremediation	**Alternative 5** Aquifer Restoration with Ground Water Re-injection
SHORT-TERM EFFECTIVENESS					
Community Protection	Continued risk to community through no action.	Dust control needed during soil removal. Vapors from treatment my increase odor.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Worker Protection	No risk to workers.	Protection required against dermal contact and inhalation during soil removal and operation recirculation wells.	Protection required against dermal contact and inhalation during soil removal and operation extraction wells.	Same as Alternative 3.	Same as Alternative 3.
Environmental Impacts	Continued impacts to well field.	Risk to future residential use eliminated. Long-term impacts to ground water significantly reduced.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Time Until Action is Complete	Not. Applicable.	Soil removal take one week. Hot spot ground water treatment 8 years. Monitoring to MCLs at fringes < 30 years.	Soil removal may take one week. Hot spot ground water treatment 10 years. Monitoring to MCLs at fringes < 30 years.	Same as Alternative 2.	Same as Alternative 3.

TABLE 10-3 COMPARATIVE ANALYSIS OF ALTERNATIVES

Criteria	**Alternative 1** No Action	**Alternative 2** Aquifer Restoration with In-situ Treatment	**Alternative 3** Aquifer Restoration with Water System Supplementation	**Alternative 4** Aquifer Restoration with Enhanced Bioremediation	**Alternative 5** Aquifer Restoration with Ground Water Re-injection
IMPLEMENTABILITY					
Ability to Construct and Operate	No construction or operation.	Straightforward construction. Difficult to do in residential area.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Ease of Doing More Action if Needed	ROD amendment required.	Can install additional wells easily if needed.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Ability to Monitor Effectiveness	No monitoring.	Monitoring will give notice before exposure occurs.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Ability to Obtain Approvals and Coordinate With Other Agencies	No approval necessary.	No permitting required.	Permit modification required for WTP use of treated water.	UIC permit required.	Same as Alternative 4.
Availability of Equipment, Specialists, and Materials	None required.	No special equipment, or materials required. Personnel to operate systems available.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Availability of Technologies	None required.	Recirculation well technology and materials readily available.	Extraction well technology and materials readily available.	Same as Alternative 3.	Same as Alternative 3.
COSTS					
Capital Cost	$ 0	$ 1,857,586	$ 1,292,245	$ 1,454,027	$ 1,320,434
Annual O&M Cost	$ 0	$ 227,650	$ 339,742	$ 369,231	$ 373,243
Total Present Worth Cost	$ 0	$ 3,537,678	$ 4,094,189	$ 4,049,191	$ 4,381,773
STATE ACCEPTANCE	Not Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
COMMUNITY ACCEPTANCE	Not Acceptable	Not Acceptable	Acceptable, but consideration for past and future air stripper use in water treatment plant wanted.	Acceptable, but consideration for past and future air stripper use in water treatment plant wanted.	Acceptable, but consideration for past and future air stripper use in water treatment plant wanted.

12.0 SELECTED REMEDY

12.1 Summary of the Rational for the Selected Remedy

Based upon the comparison of alternatives in the Supplemental Feasibility Study (SFS) and upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives and public and state comments, EPA has selected Alternative 4, Aquifer Restoration with Enhanced Biodegradation and Institutional Controls (i.e., ground water extraction with air stripping treatment and oxygenated effluent re-injection) as the selected remedy for this Site. The selected alternative is consistent with the requirements of Section 121 of CERCLA and the NCP. Based on the information available at this time, the selected alternative represents the best balance among the criteria used to evaluate remedies. The selected alternative will reduce the mobility, toxicity, and volume of contaminated ground water at the Site. In addition, the selected alternative is protective of human health and the environment, will attain all federal and state ARARs, is cost-effective and utilizes permanent solutions to the maximum extent practicable. At the completion of this remedy, ground water will meet the maximum contaminant levels allowed by law which have been determined to be protective of human health, and on-site soil will be available for unrestricted use. The estimated present worth cost of Alternative 4 is $ 4,049,139.

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementation of the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

12.2 Description of the Selected Remedy

This remedy would treat the contamination and would limit human exposure to ground water and surface soil contamination. The selected remedy consists of the following remedial actions:

- Removal and off-site disposal of contaminated surface soils behind the north building;
- Contaminated ground water extraction, treatment with a pair of low-profile air-stripping towers with trays set in series, and re-injection, with increased oxygenation of the re-injected ground water; and
- Natural attenuation of contaminants outside the capture zone of the extraction well system.

12.3 Summary of the Estimated Remedy Cost

Costs associated with this alternative include capital costs for equipment and installation, and O&M and monitoring costs (including ongoing monitoring). Capital costs are estimated to be

$1,454,027. The estimated O&M cost of this alternative is $3,469,308. The total estimated cost is $4,923,335, with a present worth, based on 5% for 8 years of active treatment and 30 years of monitoring is $4,049,189. Table 12-1 provides a detailed cost estimate summary for the selected remedy.

12.4 Expected Outcome of the Selected Remedy

Exposure will be controlled through use of treatment and off-site soil disposal. Nothing will be left above health based levels. Although land use is expected to remain commercial/ industrial, this remedy provides for unrestricted use of the property. Surface soil removal can be accomplished during the first year of the remedial action. Current commercial activity on the property will not be affected by the removal.

Ground water resources will be restored for drinking water use. Treatment will eliminate contamination in significant areas of contamination within 8 years. Natural attenuation of contamination at the fringes of the plume will be necessary due to the proximity of the well field. Monitoring will be conducted to ensure that attenuation occurs.

Soil will meet 1×10^{-6} carcinogenic risk or HQ of 1 when the cleanup is complete. Ground water will meet primary drinking water MCLs when the cleanup is complete.

13.0 STATUTORY DETERMINATION

Under Section 121 of CERCLA, 42 U.S.C. § 9621, EPA must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

13.1 Protection of Human Health and the Environment

The selected remedy provides protection of human health and the environment by eliminating, reducing, and controlling risk through engineering controls and/or institutional controls and ground water treatment as delineated through the performance standards described in Section 12.0 - SUMMARY OF SELECTED REMEDY. The residual carcinogenic risk at the Site will be reduced to acceptable levels (i.e., cancer risk between $1x10^{-6}$ and $1x10^{-4}$) or to MCLs once performance standards are achieved. Implementation of this remedy will not pose unacceptable short-term risks or cross media impacts.

TABLE 12-1. COST ESTIMATE SUMMARY FOR THE SELECTED REMEDY

Capital Costs

	Description	Quantity	Units	Cost
1.	Ground water extraction wells	6	ea	$236,886
2.	Injection wells with enhanced bio	2	ea	$ 78,469
3.	Air stripping	2	ea	$184,044
4.	Ground water monitoring wells	18	ea	$305,521
5.	Trenching and piping	1	lot	$ 86,756
6.	Granulated activated carbon	1	lot	$ 83,892
7.	Professional labor management	1	lot	$455,490
8.	Residual Waste Management	1	lot	$ 22,969

Annual Operating and Maintenance Costs

1.	O&M (year 0)	1	year	$ 345,626
2.	O&M (year 1-8)	7	year	$2,420,782
3.	MNA (year 0)	1	year	$ 9,521
4.	MNA (year 1-30)	29	year	$ 693,379

Total Costs **$ 4,923,335**

Present Worth
(based on 5% for 8 years of active treatment and 30 years monitoring) **$4,049,189**

13.2 Attainment of the Applicable or Relevant and Appropriate Requirements (ARARs)

Remedial actions performed under Section 121 of CERCLA, 42 U.S.C. § 9621, must comply with all applicable or relevant and appropriate requirements (ARARs). All alternatives considered for the Site were evaluated on the basis of the degree to which they complied with these requirements. The selected remedy is expected to meet various ARARs identified in Tables 10-1.

Waivers
Waivers are not anticipated at this Site at this time.

Other Guidance To Be Considered
Other Guidance To Be Considered (TBCs) include health-based advisories and guidance. TBCs have been utilized in setting remedial goals for ground water.

13.3 Cost Effectiveness

After evaluating all of the alternatives which satisfy the two threshold criteria, protection of human health and the environment and attainment of ARARs, EPA has concluded that the selected remedy, Alternative 4, affords the highest level of overall effectiveness proportional to its cost. Section 300.430(f)(1)(ii)(D) of the NCP also requires EPA to evaluate three out of five balancing criteria to determine overall effectiveness: long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; and short-term effectiveness. Overall effectiveness is then compared to cost to ensure that the remedy is cost-effective. The selected remedy provides for overall effectiveness in proportion to its cost. This alternative will reduce toxicity, mobility, or volume through treatment. The estimated present worth costs for the selected remedy is $4,049,189.

13.4 Utilization of Permanent Solutions to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the final remediation at the Solitron Devices Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that Alternative 4 provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost, while also considering the statutory preference for treatment as a principal element and consideration of state and community acceptance.

13.5 Preference for Treatment as a Principal Element

By treating contaminated ground water, the selected remedy addresses health threats posed by the

Site through the use of treatment technology. By utilizing treatment as a significant portion of the remedy, the statutory preference for remedies that employ treatment is satisfied.

13.6 Five-Year Review Requirements

Because this remedial action will allow for unlimited use and unrestricted exposure, statutory five-year reviews of the remedy are not required. However, since the remedy will require more than five years to implement, and attainment of remedial action objectives will take longer than five years to complete, policy reviews should be conducted.

14.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan was released for public comment in April 2004. It identified Alternative 4, aquifer restoration with enhanced biodegradation, as the Preferred Alternative for remediation. Each alternative included institutional controls to restrict the property to industrial/commercial use. During the public comment period, at the public meeting, several community members complained that surface soils were not being cleaned up to residential standards. Since the area impacted by surface contamination is relatively small, EPA determined that the cost to excavate and properly dispose of contaminated soils is minimal compared to the cost of long term institutional controls and statutory five-year review requirements. Therefore, EPA decided that arsenic and chromium contaminated surface soils will be removed and disposed of in a landfill, rather that relying on institutional controls to restrict the Site to industrial/commercial use.

PART 3: RESPONSIVENESS SUMMARY

Introduction

This responsiveness summary for the Solitron Devices Site documents for the public record concerns and issues raised during the comment period on the proposed plan. EPA's responses to those concerns and issues are included.

Overview of Comment Period

The proposed plan for the Solitron Devices Site was issued on April 13, 2004. A thirty-day public comment period for the proposed plan began April 16, 2004. A thirty-day extension was granted for the comment period, which ended May 17, 2004. Three written comments with multiple concerns were received during that comment period. A public meeting was held on April 29, 2004, in Newcomb Hall at the Riviera Beach Municipal Marina, at 180 E. 13th Street, Riviera Beach, Florida. Many comments were received and addressed during that meeting. Most of those comments are repeated below. Transcripts of the public meeting were prepared and are available at the information repository near the Site.

Concerns Raised During the Comment Period

Concerns Related to Past and Present Exposures:

1. Several comments were received related to possible past exposure to chemicals from the Site that may have been present in drinking water prior to the use of air stripping equipment in the water treatment plant. Specifically, has the community been exposed to contaminants in the public drinking water supply? If so, would that exposure be expected to have adverse health effects?

   Response: A draft public health assessment, dated August 14, 2000, was prepared by the Florida Department of Health (DOH) for the Agency for Toxic Substances and Disease Registry (ATSDR). This report states that no analytical data is available for "Finished Water" before 1981. The likelihood of illness from exposure to contaminants in municipal water before 1981 cannot be determined.

   Since 1981, only one known exceedance of health-based drinking water standards occurred in July 1982. Approximately 4 ug/L of vinyl chloride were detected in the "Finished Water", which is greater than the standard of 1 ug/L for long-term (lifelong) ingestion of vinyl chloride in drinking water, though still at a very low level. The next sample collected in January 1983, contained less than 1 ug/L of vinyl chloride. Therefore, DOH concludes that community members could have been drinking water with vinyl chloride present at slightly above lifetime calculated "minimum risk" levels for

roughly seven months. DOH further concludes that because people's estimated daily dose for that year was 157 times lower that the level found to affect animals in previous studies, no illness is expected from the estimated exposure. In addition, inhalation exposure was not likely to add significantly to the risk of illness.

2. One comment during the public meeting concerned what was being done to help residents address their past exposure. Have any human health studies been done on people who may have been exposed? Are there any plans to do any human health studies?

   Response: EPA is proposing to remediate the Site in order to prevent future exposure to contaminated ground water. The Agency for Toxic Substances and Disease Registry (ATSDR) and the State of Florida Department of Health (DOH) should be contacted to address past exposure issues. ATSDR and HRS can perform surveys and studies to track public health concerns and determine if they can be linked to discharges from a particular facility. However, the public health assessment conducted by DOH for this Site indicated that no significant exposure or health effects are expected due to exposures from 1981 to present day, and no data is available prior to 1981.

3. One comment was received asking if people who use private wells are at risk.

   Response: When EPA began working on this Site in 1996, the Director of Utilities for the City of Riviera Beach was consulted about private well use. The Director assured EPA that all potable water users in the area of suspected ground water contamination were on public drinking water, although a number of irrigation wells may be located in the area. The Florida Department of Health has located and sampled seven private wells that are in use for potable water. The seven wells are outside the area of suspected contamination. DOH tests found no contaminants in the seven wells.

   EPA does not typically sample irrigation wells because they do not impact human health and there is not typically enough information about construction of the wells to allow for meaningful data evaluation. Instead EPA prefers to install monitoring wells to define and track ground water contamination. Contaminants being tracked at this Site are relatively deep, while irrigation wells are typically shallow. It is unlikely that irrigation wells would extend deep enough into the aquifer to extract contamination.

Concerns about the Remedial Investigation/Feasibility Study:

4. One comment questioned the plume delineation shown on Figure 1 of the proposed plan. The comment provided information that PW-10A should have been included in the plume boundary.

   Response: The plume map included in the proposed plan was prepared by EPA. It is

intended to approximate the extent of the contaminant plume. EPA has requested more detailed information on the operation of the water treatment plant's well field, which does affect the expansion of the contaminant plume. EPA can and will require cleanup of the entire plume of contaminated ground water from the Solitron Devices Site. If the plume is larger, EPA will require that the larger area be cleaned up. Additional data will be gathered during design.

5. Several comments questioned why no soil removal was being done at this Site. There is concern that if soil is not removed, the ground water will never be clean. Several comments suggested that flooding might spread contamination in the community. Won't workers also be exposed.

Response: EPA proposed to restrict the property to industrial use. The property is zoned industrial and is currently in commercial/industrial use. The types of contaminants present in surface soils (inorganics) are not present at levels that could threaten ground water and essentially bound to soil particles. Because of the elevation of the Site, it is not very likely that flooding would cause the small amount of contamination to spread to residential properties.

To address the concerns expressed by the community, EPA evaluated what would be required to eliminate excess surface soil contamination. The only risk calculated for surface soils was for a hypothetical future residential use of the facility. Only one sample (SS-08) at the rear of the north building has concentrations high enough to drive the risk. Most of the area is paved. There is likely no more than 20 CY of soil that could be removed at this location. The cost to remove and dispose of the soil should be no more than $5,000, which is well within the accuracy of all of the cost estimates. By addressing soil contamination, institutional controls and statutory five-year reviews of the remedy can be eliminated.

Because removing surface soil contamination is likely more cost effective that monitoring institutional controls, EPA added a soil component to each of the alternatives described in the proposed plan.

6. If the property were developed in the future for residential use, what would happen? Who would pay in the future to clean the property up for residential use?

Response: See response to comment 5. Any future developer would be responsible for removing structures on the facility and ensure that any soil conditions created by that demolition are protective for residential use.

7. What would it cost to clean up the property to allow for residential use?

Response: See response to comments 5 and 6.

8. Several comments stated that the proposed alternatives are not adequate because they do not provide for compensation to the City of Riviera Beach.

Response: EPA recognizes that the water treatment plant operated by the City of Riviera Beach has been impacted by contamination from the Solitron Devices Site in the past. Although EPA has the authority to require parties to pay for cleaning up contamination in the environment, EPA has no authority to require parties to reimburse third parties who may have been affected by contamination. Third parties should pursue reimbursement privately through negotiations or through the courts. The proposed alternatives do not address past costs incurred by the City of Riviera Beach but do not prohibit the City of Riviera Beach from pursuing compensation privately.

9. Several comments suggested that the alternatives should require the responsible parties to fund the operating and maintenance costs of the air stripping towers in the water treatment plant while the remedy is implemented.

Response: EPA tested the combined influent to the water treatment plant (WTP) for five consecutive days in February 2002. Those test results are summarized in Table 9-1 of the ROD. Although contamination was present in individual wells, once the well water was combined at the water treatment plant, the influent met drinking water standards prior to entering the air strippers. Since historical data suggests that the contaminated ground water plume is declining, the air stripping step at the water treatment plant may no longer be necessary to meet drinking water standards for volatile organic substances, although the WTP may elect to continue use to meet other water quality standards. Since the continued operation of the City air stripper towers for additional treatment of the supply water does not appear warranted, it was not considered under these alternative, although further evaluation during remedial design may be appropriate.

10. One comment questioned if all sources of contamination have been identified? Other companies such and Pratt Whitney were identified as being nearby and using similar chemicals.

Response: The purpose of this investigation was to define the extent of contamination from the Solitron Devices Site only. EPA is also investigating another source of contamination called the Trans Circuits Site. These two sites have been historically linked to contamination in the City of Riviera Beach well field. It is possible that other sources of contamination exist in the area near the City of Riviera Beach. Any operating facilities that generate, transport or store hazardous waste are required to report activities and obtain permits through either the FDEP or the EPA. Those facilities would report and address contamination to the appropriate agency.

The Pratt-Whitney facility is located in Jupiter, Florida, not far from Riviera Beach. There is ground water contamination that is currently being addressed as part of a corrective action plan for another cleanup program. The ground water contamination from that facility does not extend to the City of Riviera Beach well field.

11. One comment asked what are VOCs and were the VOCs found in the RI/FS the same as the VOCs found in the public wells in 1981.

Response: Volatile organic compounds are compounds that have a high vapor pressure and low water solubility. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, pharmaceuticals, and refrigerants. VOCs typically are industrial solvents, such as trichloroethylene, or by-products produced by the de-chlorination of trichloroethylene. VOCs are often components of petroleum fuels, hydraulic fluids, paint thinners, and dry cleaning agents. VOCs are common ground-water contaminants.

The VOCs found in the Riviera Beach wellfield in 1981 are the same types of compounds that are found in the wellfield today, although concentrations are much lower today.

12. One comment questioned whether the contamination improved on its own since 1981.

Response: Contamination in the wellfield very likely has improved since 1981. A fairly large about of contamination appears to be resting in a stagnation zone created between the public wells. Changes in pumping and water levels can cause the contaminant concentrations to fluctuate in the wellfield.

13. One comment stressed that the RI/FS documents that releases occurred from the sewer system maintained and operated by the City of Riviera Beach as well as from the Solitron Devices Site. The comment questions why the City of Riviera Beach isn't being held responsible for releasing and spreading contamination in the aquifer?

Response: EPA is currently evaluating information about releases from the sewer system and will decide the question of liability prior to issuing Special Notice Letters for the Remedial Design and Remedial Action.

Concerns About The Proposed Remedy:

14. One comment stated that in the Evaluation of Alternatives section there is a typographical error; the term re-injection should probably be recirculation.

Response: EPA corrected the wording in the Record of Decision.

15 One comment requested the EPA clarify that restrictions would only apply to the north parcel of the former Solitron Devices Site.

Response: On page one of the Decision Summary of the Record of Decision, EPA identified the Site as only the north parcel and building. The proposed remedy was modified to include a small soil removal component instead of land use restrictions.

16. One comment asked when the City's air strippers will be taken offline.

Response: See the response to comment 9.

17. One comment requested that a detailed ground water flow evaluation including the use of a three-dimensional model be performed prior to selection of injection well locations.

Response: EPA will require that adequate remedial design, including modeling, be done prior to construction.

18. One comment questioned what will happen if the cleanup cannot be done in the time frame described.

Response: The time frame for cleanup will be re-evaluated during remedial design and periodically during the cleanup. EPA will require the responsible parties to continue operation and monitoring until the cleanup goals are met, even if it requires more time than originally estimated.

19. One comment asked if people will get bottled water or have to pay for anything if anything goes wrong.

Response: If clean water could not be provided by the water treatment plant because of contamination from this Site, alternate sources of water would be provided to residents. The alternate source would be provided at no cost to the residents.

20. One comment asked why the treated water isn't being made available to the City of Riviera Beach instead of being re-injected into the Site?

Response: Providing the treated water to the City of Riviera Beach was considered in Alternative 3. However, modification of the WTP permit to use the water from the system would be difficult and time consuming. Also, by injecting oxygen with treated water, the time required to clean up the hot spot area can be reduced by two years. Alternative 4 should allow for cleanup of more contaminated water with less reliance on monitored natural attenuation, and is preferred over alternative 3.

21. Several comments asked about natural attenuation. How can EPA chose a natural attenuation remedy in a drinking water wellfield? What cost for natural attenuation was included? Why is EPA willing to allow higher concentrations (above Florida groundwater concentration target limits) to be passively remediated instead of actively remediated?

Response: The remedy EPA selected is an active remedy requiring pumping and treating of the highest contamination areas. The remedy acknowledges that recovery wells will not be able to draw water away from the production wells and contamination between the production and recovery wells may require natural attenuation in order to meet cleanup goals, unless production wells are taken out of service to facilitate recovery. The details about how much contamination will remain after active treatment will be determined in design and during operation. When the recovery system is taken out of service, contamination will be monitored to ensure that natural attenuation is occurring. The cost for monitoring natural attenuation is currently estimated at $700,000.

22. One comment asked if the active treatment zone is the same as the area exceeding MCLs?

Response: The active treatment zone will be determined during design. The active treatment zone will be less than the area exceeding MCLs because the public supply wells are included in the area exceeding MCLs. The recovery system cannot interfere with operation of the public wells.

23. One comment asked if ARARs preclude using dilution at the point of intake as a means of assessing compliance?

Response: The primary drinking water standards point of compliance is at the tap.

24. One comment asked who will pay for the operation and maintenance of the air strippers while the remedy is being implemented?

Response: See response to comment 9.

Other General Concerns:

25. One comment questioned whether any financial burden for this remedy will be placed on the citizens of Riviera Beach?

Response: No direct financial burden would be placed on citizens by EPA. It is EPA's intent to hold all responsible parties that may be identified, liable for the cleanup of contamination.

26. One comment was received which pointed out that the increased cost of water in Riviera Beach may hurt property values. The comment stated that it is not fair that residents are going to have to take all this on their backs.

Response: There are always concerns about property values in areas affected by environmental contamination. One reason EPA agreed not to list this Site on the NPL was to alleviate concerns about the Superfund stigma affecting property values and redevelopment opportunities at the Site. EPA is sensitive to the impacts of Superfund sites on communities. EPA hopes to cleanup the contamination and restore the aquifer to its natural state, thereby eliminating any negative impacts on the community from this Site. EPA does not believe that contamination from this Site is significantly affecting the water treatment plant, at this time. However, cleaning up all other sources of contamination will be necessary to reduce water plant treatment costs.

27. One comment suggested that phased approach language from an EPA guidance document be included in the Record of Decision so that major revisions to the ROD are not required later.

Response: EPA considered the language suggested and selected language that seems most appropriate for this Site. EPA does not anticipate that major revisions to the record of decision will be required.

28. One comment asked if the solution to this problem would be all inclusive?

Response: Yes, the remedy selected by EPA is intended to be a final remedy, which when complete, will address all contamination from the Solitron Devices Site.

29. One comment asked EPA to describe the process after the public meeting?

Response: After the public meeting, EPA will review all the comments, make changes to the remedy as appropriate, prepare the Record of Decision and Responsiveness Summary, and make the approved Record of Decision and Responsiveness Summary available to the public. EPA will then invite Potentially Responsible Parties (PRPs) to conduct the Remedial Design and Remedial Action (RD/RA) with special notice letters. EPA will negotiate a Consent Decree with willing responsible parties. There will be a thirty-day comment period for the public to comment on the agreement. After consideration of all comments, the original or a modified Consent Decree will be entered in Federal District Court as a binding agreement between EPA and the PRPs. The Remedial Design will begin as required in the Consent Decree and be followed by the Remedial Action.

30. One comment asked about the time frame for finishing the work after the ROD is signed?

Response: Negotiation for the RD/RA and entry of the Consent Decree typically take one year. The RD and construction of the remedy may take another two years. The active portion of the remedy is estimated to last eight years and monitoring will continue until drinking water standards are met in the aquifer.

31. One comment asked if EPA would be willing to facilitate a meeting with the City of Riviera Beach and Honeywell to hammer out a permanent solution and stay with it to the end?

Response: EPA has met several times with representatives from the City of Riviera Beach and Honeywell and will continue to do so until all issues have been resolved and the project is complete.

APPENDIX B

STATEMENT OF WORK
FOR THE
REMEDIAL DESIGN AND REMEDIAL ACTION
AT THE
SOLITRON DEVICES SUPERFUND ALTERNATIVE SITE
RIVIERA BEACH, PALM BEACH COUNTY, FLORIDA

I. INTRODUCTION

This Statement of Work (SOW) outlines the work Honeywell International Inc. (Honeywell) shall perform at the Solitron Devices Superfund Alternative Site in Palm Beach County, Florida (Site) to fully implement the remedy as described in the Record of Decision (ROD) for the Site, dated December 17, 2004, and to achieve the Performance Standards set forth in the ROD. It is not the intent of this document to provide task specific engineering or geological guidance. Honeywell is responsible for performing the work to implement the selected remedy as set forth in the work plans and other deliverables that are required pursuant to this SOW. EPA shall conduct oversight of Honeywell's activities throughout the performance of the work. Honeywell shall assist EPA in conducting oversight activities.

EPA's review or approval of a task or deliverable shall not be construed as a guarantee as to the adequacy of such task or deliverable. If EPA modifies a deliverable pursuant to Section XI of the Consent Decree, such deliverable, as modified, shall be deemed approved by EPA for purposes of this SOW. A summary of the major deliverables that Honeywell shall submit for the work is attached as Exhibit 1. The definitions set forth in Section IV of the Consent Decree shall also apply to this SOW unless expressly provided otherwise herein.

II. OVERVIEW OF THE REMEDY

The objectives of this remedy are to:

- reduce the risk to human health from soil and sediment contamination to within EPA's acceptable risk range; and
- restore groundwater to maximum contaminant levels (MCLs) or within EPA's acceptable risk range.

III. REMEDY

The remedy includes (1) the removal and off-site disposal of contaminated surface soil behind the north building; (2) the extraction of contaminated groundwater, treatment via air stripping towers, and re-injection of oxygenated groundwater into the aquifer; and (3) monitored natural attenuation of contaminants outside the capture zone of the extraction well system.

A. Components

The major components of the remedy are described in Section 12.0, "Selected Remedy" of the ROD, attached as Appendix A to the Consent Decree.

B. Treatment

The treatment technologies for the remedy are described in Section 12.0, "Selected Remedy" of the ROD.

C. Performance Standards

Honeywell shall meet all Performance Standards, as defined in the Consent Decree and as set forth in the attached ROD.

D. Compliance Testing

Honeywell shall perform compliance testing as set forth in the Performance Standards Verification Plan required under Task V of the SOW.

IV. PLANNING AND DELIVERABLES

The specific scope of the work for any Remedial Design (RD) work not yet completed shall be documented by Honeywell in the Preliminary Design Report (PDR). The specific scope of work for the Remedial Action (RA) shall be documented by Honeywell

in an RA Work Plan. Plans, specifications, submittals, and other deliverables shall be subject to EPA review and approval in accordance with Section XI of the Consent Decree.

Honeywell shall submit a technical memorandum documenting any need for additional data along with the proposed Data Quality Objectives (DQOs) whenever such requirements are identified. Honeywell is responsible for fulfilling additional data and analysis needs identified by EPA during the RD/RA process consistent with the general scope and objectives of the Consent Decree, including this SOW.

Honeywell shall perform the following tasks:

A. TASK I - PROJECT PLANNING

Honeywell has met with and shall continue to meet with the EPA Remedial Project Manager (RPM) during the RD/RA process. Prior to the date of this Decree, Honeywell conducted certain pre-design tasks under an Administrative Order on Consent (AOC) dated December 13, 2006. These tasks included data collection, monitoring well installation, and groundwater modeling. A project planning meeting was held on January 31, 2007, to discuss the initial groundwater monitoring results and groundwater modeling. In attendance were representatives from EPA, Honeywell, the City of Riviera Beach, and the South Florida Water Management District. Discussions during this meeting provided the basis for additional groundwater data collection and the location of additional groundwater monitoring wells which were installed in June 2007. Additional groundwater samples were collected in June and July 2007 and were incorporated into the groundwater model.

B. TASK II - REMEDIAL DESIGN

The RD shall provide the technical details for implementation of the RA in accordance with currently accepted environmental protection technologies and standard professional engineering and construction practices. The RD shall provide EPA with an understanding of the design plans, while allowing Honeywell the flexibility to complete final design specifications in concert with the selected contractor during the RA phase, recognizing that specific information may need to be developed to obtain necessary construction permits and/or approvals from local authorities.

1. Preliminary Design Report

Honeywell shall submit a Draft Preliminary Design Report (PDR) to EPA for review and comment. Upon receiving comments from EPA on the Draft PDR, Honeywell shall address those comments in a Final PDR which shall be submitted to EPA for approval.

The PDR shall summarize the pre-design activities already conducted, which include a summary of field activities and observations, interpretations of the data and geology, and recommendations (required to be submitted under the AOC); groundwater modeling, and basis of design. The PDR shall satisfy the deliverable required to be submitted under the AOC. The PDR shall also contain a plan for conducting remaining RD activities. EPA's review and/or approval of design submittals only allows Honeywell to proceed to the next step of the design process. It does not imply acceptance of later design submittals that have not been reviewed, nor that the remedy, when constructed, will meet Performance Standards. Specifically, the PDR should contain the following components:

a. An introduction and background summary setting forth the following:

- Location and Physical Setting;
- Summary of Operational History;
- Site Conceptual Model; and
- Summary of Regulatory and Investigational History.

b. A discussion of the current understanding of Site conditions including:

- Site Lithology and Hydraulic Gradient;
- City of Riviera Beach Well Field Operations;
- South Florida Water Management District Regional Model;
- Nature and Extent of Contamination; and
- Geochemical Conditions/Natural Attenuation Processes.

c. A discussion of the criteria which form the basis of the proposed design including:

- Objectives of the RD/RA;
- General Assumptions;
- Site-Specific Model Application;
- Site-Specific Problems and Potential Problems; and
- Additional Data Needs.

d. A proposed conceptual design addressing soil excavation and the treatment of contaminated groundwater. The conceptual design shall include:

- A summary of design criteria which support the technical aspects of the design. Specifically, the design criteria section shall include the preliminary design assumptions and parameters including:
  - Waste Characterization;
  - Pretreatment Requirements;
  - Volume of Media Requiring Treatment;
  - Treatment Schemes;
  - Materials and Equipment;
  - Performance Standards;
  - Permit Requirements; and
  - Monitoring Requirements.
- Preliminary plans, drawings or specifications which describe the design. This shall include, at a minimum:
  - General System Component Requirements and Operation Rates;

- Proposed Well, Equipment and Piping Locations/Layout;

- A permitting plan to ensure that all activities are performed in accordance with the requirements of all applicable federal, state and local laws and regulations, including but not limited to, the South Florida Water Management District, Palm Beach County, and the City of Riviera Beach. Any off-site disposal shall be in compliance with the policies stated in the Procedure for Planning and Implementing Off-site Response Actions (Federal Register, Volume 50, Number 214, November, 1985, pages 45933 - 45937) and Federal Register, Volume 55, Number 46, March 8, 1990, page 8840, and the National Contingency Plan, Section 300.440; and

  The permitting plan shall identify all local and off-site disposal/discharge permits that are required, the time required to process the permit applications, and a schedule for submittal of the permit applications. The plan shall also identify all local permits that Honeywell is not required to obtain pursuant to the National Contingency Plan, Section 300.400 (e), and a discussion as to how Honeywell will meet the intent of these permits.

- A groundwater monitoring plan to address the monitored natural attenuation requirements of the ROD and to measure the performance of the treatment system. The plan shall identify the location for any additional monitoring wells needed and shall contain sampling procedures to ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols and that the data generated shall meet the DQOs established. The groundwater monitoring plan shall include a Field Sampling and Analysis Plan (FSAP) and a Quality Assurance Project Plan (QAPP).

The FSAP shall define in detail the sampling and data-gathering methods that shall be used on the project. It shall include sampling objectives, sample location and frequency, sampling equipment and procedures, and sample handling and analysis. The FSAP shall be written so that a field sampling team unfamiliar with the Site would be able to gather the samples and field information required. The QAPP shall describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that shall be used to achieve the desired DQOs. DQO's shall be established based on the purpose of the sample collected and shall, at a minimum, reflect use of analytical methods for obtaining data of sufficient quality to meet National Contingency Plan requirements as identified at 300.435 (b). In addition, the QAPP shall address personnel qualifications, sampling procedures, sample custody, analytical procedures, and data reduction, validation, and reporting. These procedures must be consistent with the Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual and the guidances specified in Section VIII of the Consent Decree. The QAPP shall be prepared in accordance with "EPA Requirements for Quality Assurance Project Plans, EPA QA/R5" (EPA/240B-01/003 March 2001). Florida SOPs referenced in F.A.C. Chapter 62-160, Quality Assurance Rules may be cited in the QAPP where they apply to a specific activity.

Prior to conducting any sampling activity, Honeywell shall demonstrate, to EPA's satisfaction, that each laboratory used is qualified to conduct the proposed work and meets the requirements specified in Section VIII of the Consent Decree. EPA may require Honeywell to submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment and material specification, and laboratory analyses of performance samples (blank and/or spike samples). In addition, EPA may require submittal of data

packages equivalent to those generated by the EPA Contract Laboratory Program (CLP).

- A Design/Project Management Plan and General Schedule which contains:
  - a description of the work products that shall be submitted to EPA and the specific dates for completion of each required task and/or the submission of each deliverable required by the Consent Decree and this SOW;
  - a data management plan;
  - a plan for document control for all activities conducted during the RD/RA;
  - a project delivery strategy that shall address the management approach for implementing the RD/RA, including the procurement methods and contracting strategy that will be used, the phasing alternatives, and any contractor and equipment availability concerns. If the construction of the remedy is to be accomplished by Honeywell's in-house resources, the document shall identify those resources; and
  - a proposed construction schedule.
- Estimate of Cost - An estimate within +15 percent to -10 percent of actual construction costs shall be submitted.

2. Honeywell shall prepare an updated Community Relations Plan which contains a description of the community relations support activities that Honeywell will conduct during the RD. At EPA's request, Honeywell shall assist EPA in preparing and disseminating information to the public regarding the RD work to be performed.

   In addition to the community relations activities, within 30 days of a request by EPA, Honeywell shall provide EPA with a Technical Assistance Plan (TAP) for providing and administering up to $50,000 to be used by a Qualified Community Group to hire independent technical

advisors during the Work conducted pursuant to the Consent Decree. The Qualified Community Group will use these funds to (1) hire a technical advisor, independent from Honeywell, or any PRP, who can help group members understand Site cleanup issues. The technical advisor will help interpret and comment on Site-related documents developed under this SOW and through the RD/RA and/or to (2) share this information with others in the community. In the case of a technical advisor, the Qualified Community group may not hire a person or entity doing work for the Federal or State government or any other entity at the same site for which the Qualified Community Group is seeking a technical advisor.

a. Criteria for a Qualified Community Group

To qualify for TAP assistance, a community group shall be: 1) comprised of people who are affected by a release or threatened release at the Site and 2) able to demonstrate its ability to adequately and responsibly manage TAP responsibilities. A group is ineligible if it is: 1) a potentially responsible party (PRP) at the Site, represents such a PRP, or receives money or services from a PRP; 2) affiliated with a national organization; 3) an academic institution; 4) a political subdivision; 5) a tribal government; or 6) a group established or presently sustained by any of the entities listed above or if members of the group represent any of these entities. TAP assistance may be awarded to only one qualified group at a time for purposes of this Consent Order and Statement of Work.

b. EPA's Responsibilities under the TAP

EPA shall provide applications (Requests for TAP Assistance) to interested community groups and review completed applications based on the criteria specified in Section a. above and other relevant factors. EPA shall document its selection of a Qualified Community Group and inform the group and Honeywell about its decision. Honeywell shall notify the selected Qualified Community Group. EPA also shall inform the selected group of the activities that it can and cannot undertake with the funds provided by Honeywell. EPA shall review and approve the Qualified Community Group's recommended choice of an independent technical advisor. If necessary, EPA may provide the selected Qualified Community Group with assistance soliciting an independent Technical Advisor. EPA also shall review any request from a selected Qualified Community Group for additional TAP funds.

c. Honeywell's Responsibilities under the TAP

Upon a request from EPA and based on a sample provided by EPA, Honeywell shall draft a TAP Work Plan consistent with this SOW, related Consent Order, and relevant EPA policy and guidance. Honeywell will submit it in draft for EPA's prior written approval. If EPA disapproves of or requires revisions to the TAP, in whole or in part, Honeywell shall amend and submit to EPA a revised TAP that is responsive to EPA's comments, within 30 days of receiving EPA's comments. Once approved, Honeywell will implement the TAP.

The TAP shall state that Honeywell will provide and administer up to $50,000 to a Qualified Community Group selected by EPA pursuant to Section b. above. The TAP shall also include a proposal for providing, as necessary, up to $5,000 to the selected group to cover its estimated start-up costs.

In the TAP, Honeywell shall include a proposed plan for negotiating an agreement with the selected Qualified Community Group that shall specify the duties of Honeywell and Qualified Community Group, respectively. Honeywell should use a sample agreement (to be provided by EPA) as a starting point for negotiations and shall submit a draft agreement to EPA for prior written approval.

Within 15 days of EPA's request, Honeywell shall designate a point of contact to be the primary contact with the selected Qualified Community Group. The point of contact also may respond to the public's inquiries and questions about the Site and/or TAP. Honeywell may hire a third party (e.g., a trustee) to act as the point of contact. However, any such third party must be approved by EPA. If Honeywell opts to hire a third party, it shall submit in writing that person's name, title, and qualifications to EPA within 15 days of EPA's request for a TAP.

The TAP shall state that Honeywell shall provide EPA quarterly progress reports regarding the implementation of the TAP.

3. Final Remedial Design

Honeywell shall submit a Draft Remedial Design (RD) to EPA for review and comment. Upon receiving comments from EPA on the Draft RD,

Honeywell shall address those comments in a Final RD which shall be submitted to EPA for approval. All Final Remedial Design documents shall be certified by a Professional Engineer registered in the State of Florida. EPA must provide written approval of the Final RD to Honeywell before Honeywell may initiate the RA, unless specifically authorized by EPA. EPA's review and/or approval of the RD only allows Honeywell to proceed to the next step which is initiation of the RA. It does not imply that the remedy, when constructed, will meet Performance Standards.

C. TASK III - REMEDIAL ACTION

The Remedial Action shall be performed by Honeywell to implement the response actions selected in the ROD.

1. Remedial Action Work Plan

Concurrent with the submittal of the Final Remedial Design, Honeywell shall submit a Draft Remedial Action (RA) Work Plan to EPA for review and comment. Upon receiving comments from EPA on the Draft RA Work Plan, Honeywell shall address those comments in a Final RA Work Plan, which shall be submitted to EPA for approval.

Upon approval of the Final Remedial Design and the Final RA Work Plan, Honeywell shall implement the Final RA Work Plan in accordance with the approved schedule. Honeywell shall not undertake significant field changes to the RA as set forth in the Final RA Work Plan and Final Design without the approval of EPA. Honeywell shall submit deliverables to EPA for review and approval in accordance with Section XI of the Consent Decree. Review and/or approval of submittals does not imply acceptance of later submittals that have not been reviewed, nor that the remedy, when constructed, will meet Performance Standards.

The RA Work Plan shall set forth a detailed plan of action for completing the RA activities. The objective of this work plan is to provide for the safe and efficient completion of the RA, and shall include a comprehensive description of the work to be performed and the schedule for completion of each major task and submission of each deliverable. Specifically, the RA Work Plan shall include the following:

a. A Project Management Plan that sets forth the following:

- A list of each task to be performed, a description of each task, a schedule for completion of each task, and a description of the work products to be provided to EPA;

- A schedule for completion of each required task and submission of each deliverable required by this Consent Decree and this SOW; and

- A provision setting forth the production of monthly progress reports to EPA.

b. An Updated Community Relations Plan, if determined necessary by EPA, which describes the community relations support activities Honeywell will conduct during the RA. At EPA's request, Honeywell shall assist EPA in preparing and disseminating information to the public regarding the RA work to be performed.

c. A Construction Management Plan that describes how the construction activities are to be implemented and coordinated with EPA during the RA. Honeywell shall identify, by name, the person who shall serve as its Remedial Action Coordinator and the person who will serve as Honeywell's representative on-site during the Remedial Action. Honeywell shall also identify other key project management personnel and describe each person's duties, the chain of authority, and provide EPA with an organizational chart. In addition, Honeywell shall provide a plan for the administration of construction changes, including how EPA will review and approve any changes.

d. A Construction Quality Assurance Plan that ensures, with a reasonable degree of certainty, that the completed Remedial Action meets or exceeds all design criteria, plans and specifications, and Performance Standards. The Construction Quality Assurance Plan shall incorporate relevant provisions of the Performance Standards Verification Plan (see Task V). At a minimum, the Construction Quality Assurance Plan shall include the following elements:

- A description of the quality control organization, including a chart showing lines of authority, identification of the members of the Independent Quality Assurance Team (IQAT), and acknowledgment that the IQAT will implement the control system for all aspects of the work specified and shall report to the project coordinator and EPA. The IQAT members shall be representatives from testing and inspection organizations and/or the Supervising Contractor and shall be responsible for the QA/QC of the Remedial Action. The members of the IQAT shall have a

good professional and ethical reputation, previous experience in the type of QA/QC activities to be implemented, and demonstrated capability to perform the required activities. They shall also be independent of the construction contractor.

- The name, qualifications, duties, authorities, and responsibilities of each person assigned a QC function.

- Description of the observations and control testing that will be used to monitor the construction and/or installation of the components of the Remedial Action. This includes information which certifies that personnel and laboratories performing the tests are qualified and the equipment and procedures to be used comply with applicable standards. Any laboratories to be used shall be specified. Acceptance/Rejection criteria and plans for implementing corrective measures shall be addressed.

- A schedule for managing submittals, testing, inspections, and any other QA function (including those of contractors, subcontractors, fabricators, suppliers, purchasing agents, etc.) that involve assuring quality workmanship, verifying compliance with the plans and specifications, or any other QC objectives. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, air quality and emissions monitoring records and waste disposal records, etc.

- Reporting procedures and reporting format for QA/QC activities including such items as daily summary reports, schedule of data submissions, inspection data sheets, problem identification and corrective measures reports, evaluation reports, acceptance reports, and final documentation.

- A list of definable features of the work to be performed. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements.

2. Construction Health and Safety Plan/Contingency Plan

Concurrent with the submittal of the Final RA Work Plan, Honeywell shall submit a Construction Health and Safety Plan/Contingency Plan to EPA for Review. The plan shall conform with Honeywell's health and safety program, and in compliance with OSHA regulations and protocols. The Construction Health and Safety Plan shall include a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and site control. EPA will not approve Honeywell's Construction Health and Safety Plan/Contingency Plan, but rather EPA will review it to ensure that all necessary elements are included, and that the plan provides for the protection of human health and the environment. This plan shall include a Contingency Plan and a Spill Control and Countermeasures Plans. The Contingency Plan is to be written for the on-site construction workers and the local affected population. It shall include the following items:

a. Name of person who will be responsible in the event of an emergency incident;

b. Plan for initial site safety indoctrination and training for all employees, name of the person who will give the training, and the topics to be covered;.

c. Plan and date for meeting with the local community, including local, state and federal agencies involved in the cleanup, as well as the local emergency squads and the local hospitals; and

d. A list of the first aid and medical facilities including, location of first aid kits, names of personnel trained in first aid, a clearly marked map with the route to the nearest medical facility, all necessary emergency phone numbers conspicuously posted at the job site (i.e., fire, rescue, local hazardous material teams, National Emergency Response Team, etc.).

e. Plans for protection of public and visitors to the job site.

f. A Spill Control and Countermeasures Plan which shall include the following:

- Contingency measures for potential spills and discharges from materials handling and/or transportation;

- A description of the methods, means, and facilities required to prevent contamination of soil, water, atmosphere, and uncontaminated structures, equipment, or material by spills or discharges;

- A description of the equipment and personnel necessary to perform emergency measures required to contain any spillage and to remove spilled materials and soils or liquids that become contaminated due to spillage. This collected spill material must be properly disposed of; and

- A description of the equipment and personnel necessary to perform decontamination measures that may be required for previously uncontaminated structures, equipment, or material.

3. Preconstruction Conference

A Preconstruction Conference shall be held after approval of the RD, but before initiation of construction. This conference shall include Honeywell and federal, state and local government agencies and shall:

a. Define the roles, relationships, and responsibilities of all parties;

b. Review methods for documenting and reporting inspection data;

c. Review methods for distributing and storing documents and reports;

d. Review work area security and safety protocols;

e. Review the Construction Schedule; and

f. Conduct a site reconnaissance to verify that the design criteria and the plans specifications are understood and to review material and equipment storage locations.

Honeywell shall document the Preconstruction Conference including names of people in attendance, issues discussed, clarifications made, special instructions issued, etc. and shall provide documentation to EPA.

4. Prefinal Construction Inspection

Upon preliminary project completion, Honeywell shall notify EPA for the purpose of scheduling a Prefinal Construction Inspection by EPA. Participants should include the Project Coordinators, Supervising Contractor, Construction Contractor, Natural Resource Trustees and other federal, state, and local agencies with a jurisdictional interest. The Prefinal Construction Inspection shall consist of a walk-through inspection of the entire project site. The objective of the inspection is to determine whether the construction is complete and consistent with the Consent Decree. Any outstanding construction items discovered during the inspection shall be identified and noted on a punch list. Additionally, treatment equipment shall be operationally tested by Honeywell. Honeywell shall certify that the equipment has performed to effectively meet the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed. Honeywell shall submit a Prefinal Construction Inspection Report, which outlines the outstanding construction items, actions required to resolve the items, completion date for the items, and an anticipated date for the Final Inspection.

5. Final Construction Inspection

Upon completion of the all outstanding construction items, Honeywell shall notify EPA so that the Agency can perform a Final Construction Inspection. Participants should include the Project Coordinators, Supervising Contractor, Construction Contractor, Natural Resource Trustees and other federal, state, and local agencies with a jurisdictional interest. The Final Construction Inspection shall consist of a walk-through inspection of the entire project site. EPA shall use the Prefinal Construction Inspection Report as a check list during the Final Construction Inspection. During this inspection, EPA will focus on the outstanding construction items identified in the Prefinal Construction Report. All tests that were originally unsatisfactory shall be conducted again. EPA shall confirm during the Final Construction Inspection that all outstanding items have been resolved. Any outstanding construction items discovered during the inspection still requiring correction shall be identified and noted on a punch list. If any items are still unresolved, the inspection shall be considered to be a Prefinal Construction Inspection requiring another Prefinal Construction Inspection Report and subsequent Final Construction Inspection.

6. Final Construction Report

Within thirty (30) days following the conclusion of the Final Construction Inspection, Honeywell shall submit a Final Construction Report. EPA will review the Draft report and will provide comments to Honeywell. The Final Construction Report shall include the following:

a. Brief description of how outstanding items noted in the Prefinal Inspection were resolved;

b. Explanation of modifications made during the RA to the Final RD and RA Work Plans and why these changes were made;

c. As-built drawings; and

d. Synopsis of the construction work defined in the SOW and certification that the construction work has been completed.

7. Remedial Action Report

As provided in Section XIV of the Consent Decree, within 90 days after Honeywell concludes that the Remedial Action has been fully performed and the Performance Standards have been attained, Honeywell shall so certify to the United States and shall schedule and conduct a pre-certification inspection to be attended by EPA and Honeywell. If after the pre-certification inspection Honeywell still believes that the Remedial Action has been fully performed and the Performance Standards have been attained, Honeywell shall submit a Draft Remedial Action (RA) Report to EPA in accordance with Section XV of the Consent Decree, for review and comment by EPA. Upon receiving comments from EPA on the Draft Remedial Action Report, Honeywell shall address those comments in a Final Remedial Action Report, which shall be submitted to EPA for approval.

The RA Report shall include the following:

a. A copy of the Final Construction Report;

b. Synopsis of the work defined in this SOW and a demonstration in accordance with the Performance Standards Verification Plan that Performance Standards have been achieved;

c. Certification that the Remedial Action has been completed in full satisfaction of the requirements of the Consent Decree; and

d. A description of how Honeywell will implement any remaining part of the EPA approved Operation and Maintenance Plan.

After EPA review, Honeywell shall address any comments and submit a revised report. As provided in Section XV of the Consent Decree, the Remedial Action shall not be considered complete until EPA approves the RA Report.

D. TASK IV - OPERATION AND MAINTENANCE

Operation and Maintenance (O&M) shall be performed in accordance with the approved Operation and Maintenance Plan.

1. Operation and Maintenance Plan

At the 30 percent construction stage, Honeywell shall submit to EPA a Draft Operation and Maintenance Plan for review. Upon receiving comments from EPA on the Draft Operation and Maintenance Plan, Honeywell shall address those comments in a Final Operation and Maintenance Plan, which shall be submitted to EPA for approval.

The Final Operation and Maintenance Plan must be reviewed and approved by EPA prior to initiation of Operation and Maintenance activities. If necessary, the Final Operation and Maintenance Plan shall be modified to incorporate any design modifications implemented during the Remedial Action.

Upon approval of the Final Operation and Maintenance Plan, Honeywell shall implement the Final Operation and Maintenance Plan in accordance with the schedule contained therein. This plan shall describe start-up procedures, operation, troubleshooting, training, and evaluation activities that shall be carried out by Honeywell. The plan shall address the following elements:

a. Equipment start-up and operator training including:

- Technical specifications governing treatment systems;
- Requirements for providing appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation of the systems; and
- Schedule for training personnel regarding appropriate operational procedures once start-up has been successfully completed.

b. Description of normal operation and maintenance including:

- Description of tasks required for system operation;
- Description of tasks required for system maintenance;
- Description of prescribed treatment or operating conditions; and
- Schedule showing the required frequency for each O&M task.

c. Description of potential operating problems including:

- Description and analysis of potential operating problems;
- Sources of information regarding problems; and
- Common remedies or anticipated corrective actions.

d. Description of routine monitoring and laboratory testing including:

- Description of monitoring tasks;
- Description of required laboratory tests and their interpretation;
- Required QA/QC; and
- Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.

e. Description of alternate O&M including:

- Should system fail, alternate procedures to prevent undue hazard; and
- Analysis of vulnerability and additional resource requirements should a failure occur.

f. Safety Plan including:

- Description of precautions to be taken and required health and safety equipment, etc., for site personnel protection and
- Safety tasks required in the event of systems failure.

g. Description of equipment including:

- Equipment identification;
- Installation of monitoring components;
- Maintenance of site equipment; and
- Replacement schedule for equipment and installation components.

h. Records and reporting including:

- Daily operating logs;
- Laboratory records;
- Records of operating cost;
- Mechanism for reporting emergencies;
- Personnel and Maintenance Records; and
- Monthly reports to State/Federal Agencies.

E. TASK V - PERFORMANCE MONITORING

Honeywell shall conduct performance monitoring to ensure that all Performance Standards are met.

1. Performance Standards Verification Plan

The purpose of the Performance Standards Verification Plan is to provide a mechanism to ensure that both short-term and long-term Performance Standards for the Remedial Action are met. Honeywell shall submit a Draft Performance Standards Verification Plan to EPA for review and comment with the Draft Design. Upon receiving comments from EPA on the Draft Performance Standards Verification Plan, Honeywell shall address those comments in a Final Performance Standards Verification Plan, which shall be submitted to EPA for approval. Once approved, Honeywell shall implement the Performance Standards Verification Plan on the approved schedule.

The Performance Standards Verification Plan shall include:

a. Performance Standards Verification Field Sampling and Analysis Plan that provides guidance for all fieldwork by defining in detail the sampling and data gathering methods to be used;

b. Performance Standards Verification Quality Assurance/Quality Control plan that describes the quality assurance and quality control protocols which will be followed in demonstrating compliance with Performance standards; and

c. A specification of those tasks to be performed by Honeywell to demonstrate compliance with the Performance Standards and a schedule for the performance of these tasks.

REFERENCES

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RD/RA process. Honeywell shall review these guidances and shall use the information provided therein in performing the RD/RA and preparing all deliverables under this SOW.

1. "National Oil and Hazardous Substances Pollution Contingency Plan, Final Rule", Federal Register 40 C.F.R. Part 300, March 8, 1990.

2. "Superfund Remedial Design and Remedial Action Guidance," U.S. EPA, Office of Emergency and Remedial Response, June 1986, OSWER Directive No. 9355.O-4A.

3. "Interim Final Guidance on Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties," U.S. EPA, Office of Emergency and Remedial Response, February 14, 1990, OSWER Directive No. 9355.5-01.

4. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final," U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 355.3-01.

5. "A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

6. "U.S. EPA NEIC Policies and Procedures Manual," EPA-330/9-78-001-R, May 1978, revised November 1984.

7. "Data Quality Objectives for Remedial Response Activities," U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.

8. "Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Research and Development, Cincinnati, OH, QAM-004/80, December 29, 1980.

9. "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Emergency and Remedial Response, QAM-005/80, December 1980.

10. "Users Guide to the EPA Contract Laboratory Program," U.S. EPA, Sample Management Office, August 1982.

11. "Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual," U.S. EPA Region IV, Environmental Services Division, February 1, 1991, (revised periodically).

12. "U. S. EPA Contract Laboratory Program Statement of Work for Organics Analysis," U.S. EPA, Office of Emergency and Remedial Response, February 1988.

13. "U. S. EPA Contract Laboratory Program Statement of Work for Inorganics Analysis," U.S. EPA, Office of Emergency and Remedial Response, July 1988.

14. "Quality in the Constructed Project: A Guideline for Owners, Designers, and Constructors, Volume 1, Preliminary Edition for Trial Use and Comment," American Society of Civil Engineers, May 1988.

15. "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.

16. "CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (Draft), OSWER Directive No. 9234.1-01 and -02.

17. "Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response, (Draft), OSWER Directive No. 9283.1-2.

18. "Guide for Conducting Treatability Studies Under CERCLA," U.S. EPA, Office of Emergency and Remedial Response, Pre-publication Version.

19. "Health and Safety Requirements of Employees Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

20. "Standard Operating Safety Guides," U.S. EPA, Office of Emergency and Remedial Response, November 1984.

21. "Standards for General Industry," 29 C.F.R Part 1910, Occupational Health and Safety Administration.

22. "Standards for the Construction Industry," 29 C.F.R 1926, Occupational Health and Safety Administration.

23. "NIOSH Manual of Analytical Methods," 2d edition. Volumes I - VII, or the 3rd edition, Volumes I and II, National Institute of Occupational Safety and Health.

24. "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," National Institute of Occupational Safety and Health/Occupational Health and Safety Administration/United States Coast Guard/ Environmental Protection Agency, October 1985.

25. "TLVs - Threshold Limit Values and Biological Exposure Indices for 1987 - 88," American Conference of Governmental Industrial Hygienists.

26. "American National Standards Practices for Respiratory Protection," American National Standards Institute Z88.2-1980, March 11, 1981.

27. "Quality in the Constructed Project - Volume 1," American Society of Civil Engineers, 1990.

[Other guidances referenced in CD that are not listed above (i.e. QA, Sample and Data Analysis, etc.)]

SUMMARY OF THE MAJOR DELIVERABLES FOR THE REMEDIAL DESIGN AND REMEDIAL ACTION AT THE SOLITRON DEVICES SITE

DELIVERABLE **(# copies to EPA / # copies to FEP)**	**EPA RESPONSE**
TASK I: PROJECT PLANNING	**N/A**
None	
TASK II: REMEDIAL DESIGN	
Draft Preliminary Design Report (4 to EPA / 2 to FDEP)	Review and Comment
Final Preliminary Design Report (4 to EPA / 2 to FDEP)	Review and Approve
Updated Community Relations Plan (3 to EPA / 1 to FDEP)	Review and Approve
Draft Remedial Design (4 to EPA / 2 to FDEP)	Review and Comment
Final Remedial Design (4 to EPA / 2 to FDEP)	Review and Approve
TASK III: REMEDIAL ACTION	
Draft RA Work Plan (3 to EPA / 2 to FDEP)	Review and Comment
Final RA Work Plan (3 to EPA / 2 to FDEP)	Review and Approve
Updated Community Relations Plan (3 to EPA / 1 to FDEP)	Review and Approve
Construction Health and Safety Plan/Contingency Plan	Review

Prefinal Construction Inspection Report (4 to EPA / 2 to FDEP)	Review and Comment
Final Construction Report (4 to EPA / 2 to FDEP)	Review and Approve
Draft Remedial Action Report (4 to EPA / 2 to FDEP)	Review and Comment
Final Remedial Action Report (4 to EPA / 2 to FDEP)	Review and Approve
TASK IV: OPERATION AND MAINTENANCE	
Draft Operation and Maintenance Plan (4 to EPA / 2 to FDEP)	Review and Comment
Final Operation and Maintenance Plan (4 to EPA / 2 to FDEP)	Review and Approve
TASK V: MONITORING	
Draft Performance Standards Verification Plan (4 to EPA / 2 to FDEP)	Review and Comment
Final Performance Standards Verification Plan (4 to EPA / 2 to FDEP)	Review and Approve

One copy submitted to EPA and one copy submitted to the State shall be unbound, the remainder shall be bound.